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IBM official details net mgmt. plans

By Michael Cooney
Senior Editor

RALEIGH, N.C. — During the next 12 months, IBM will announce products supporting a major shift in its net management strategy that puts the AIX NetView/6000 platform into the manager of managers role now held only by NetView.

The enhancements will include new applications that give NetView/6000 control over Systems Network Architecture and local-area nets, increased support for industry-leading databases and the ability to scale the platform to handle increasingly larger nets.

IBM expands Ethernet, APPN capabilities for 3174 controller line, page 4.

IBM last year introduced NetView/6000 as a basic Simple Network Management Protocol management system for Transmission Control Protocol/Internet Protocol networks. But the company is fast becoming one of the company's most strategic management platforms.

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PHOTO ©1993 JOHN THOMPSON

Middle ground: Middleware vendors convene to discuss joint initiatives in their emerging marketplace.

Middleware vendors inch their way to collaboration

By Wayne Eckerson
Senior Editor

BOSTON — Finding strength in numbers, a group of middleware vendors last week took a tentative first step toward establishing interoperability among their products, which promise to play a key role in supporting distributed computing environments.

In a meeting convened here by *Network World,* seven vendors of interprogram messaging software agreed to hammer out a common set of terms for describing middleware functions and features. The vendors also discussed ways of gauging user requirements for middleware and the possibility of developing interoperability specifications, although they did not formally commit to developing such specs.

The companies — Covia Technologies, Inc., Digital Equipment Corp., Horizon Strategies, Inc., IBM, Momentum Corp., PeerLogic, Inc. and Systems Strategies, Inc. — offer middleware software that runs on multiple platforms and works with a variety of network protocols.

The vendors agreed on the importance of educating users about the role their brand of middleware — dubbed message-oriented middleware (MOM) — will play in building distributed applications vis-a-vis technologies such as as remote procedure calls, transaction processing monitors and data access methods.

"We see a strong need to edu-

(continued on page 74)

Cisco offers parcel of enterprise upgrades

Routing protocol enhancements address IGRP performance, interoperability with OSPF standard.

By Maureen Molloy
Senior Editor

MENLO PARK, Calif. — Cisco Systems, Inc. last week said it will enhance support of three major routing protocols to improve performance and give users greater flexibility in designing enterprisewide internetworks.

The company will roll out during the next year a new version of its proprietary Interior Gateway Routing Protocol (IGRP), as well as new implementations of the Open Shortest Path First (OSPF) and Intermediate System-to-Intermediate System (IS-IS) industry-standard protocols.

The enhancements will aid in segmenting large internets, provide basic interoperability between OSPF and IGRP nets, let IGRP-based routers route around failed links faster, and reduce the complexity and overhead inher-

(continued on page 6)

NT set to make LAN mark

By Fredric Paul
Senior Editor

ANALYSIS

ATLANTA — Ending more than a year of hype and speculation, Microsoft Corp. next week makes its bid to fundamentally alter the local-area network landscape with the formal introduction of Windows NT at Comdex/Spring here.

Beta users, software developers and industry pundits say the new operating system — with its built-in network capabilities — will be used initially as an application server primarily in Novell, Inc. NetWare environments.

InfoCorp, a Santa Clara, Calif., market research firm, predicts that by 1996, Windows NT will garner 12% of the network operating system (NOS) market, limited mostly to application-specific duties such as database support.

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NETLINE

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AT&T TO REMEDY users' billing woes with Billing Edge package. Page 2.

MICROCOM, WELLFLEET bring dial-up features to routers. Page 4.

IBM'S THUNDERBIRD gives remote users dial-up LAN access. Page 4.

RABBIT READIES combination gateway/router. Page 4.

IBM, ORACLE, US WEST ride the multimedia wave into the future. Page 6.

NCR ENHANCES StarSentry tool, offers PC-based router. Page 6.

BUYER'S GUIDE shows an inverse mux buy is no longer risky business. Page 41.

NEWSPAPER
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Optimism is guiding force in prepping '94 budgets

By Charles Bruno
Features Editor

The yearly ritual of hunkering down and hammering out a plan to feed the network monster is under way.

All indicators from users who are tailoring budgets for 1994 suggest spending will pick up as companies tackle network projects they postponed last year.

Gone is the concern about the sagging economy that forced users to adopt a cautious spending outlook a year ago. That approach has been replaced by the optimism that improved business performance will yield greater infrastructure investments.

"My gut feeling is that business seems to be on the upswing, and I think people are going ahead with projects — spending more money," says Thomas Festa, communications director at Liberty Brokerage, Inc. in New York.

Network World's 1993 Annual Budget Survey shows nearly 80% of the respondents believe the economy will improve or stay the same in 1994. By contrast, in last year's survey, 62% of the respondents thought the economy was on the mend.

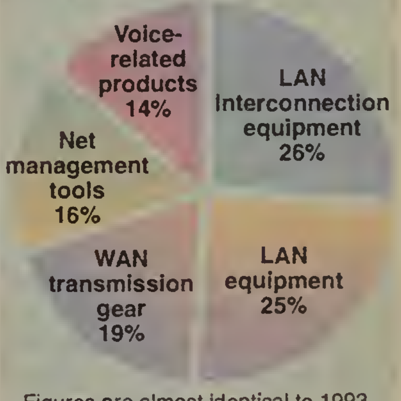
There is also evidence that more users are in a buying mood and will undertake new projects or at least pick up on those that had been postponed.

Only 40% of the respondents said they had to hold back on major capital equipment expenditures this year, down from the 1992 study when half of the respondents reported holding back on purchases. This improvement is expected to continue into

(continued on page 47)

The more things change...

Breakdown of 1994 capital equipment budget



Figures are almost identical to 1993 figures, despite an anticipated 16.7% budget increase.

GRAPHIC BY SUSAN SLATER
SOURCE: *NETWORK WORLD*

Innovative mgmt. system relies on X.500 directory

DESC employs the technology to make network data accessible to all resident mgmt. systems.

By Bob Brown
Senior Editor

ENGLEWOOD, Colo. — Systems integrator SSDS, Inc. is using X.500 technology to support an innovative enterprise network and systems management platform that it plans to make commercially available.

Strich

SSDS is using an X.500 directory — something usually associated with electronic mail — to store and synchronize configuration data on all devices across a network under its new Distributed Enterprise Service Center (DESC). DESC provides a common repository for both static and dynamic information about net devices and applications, making it accessible to management systems, no matter where they reside.

DESC is used to support information sharing among multivendor network management systems on SSDS' own net. But SSDS has begun rolling out DESC to other users, the first of which will

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North Carolina to install $160 million ATM network

WAN backbone will eventually link 3,400 sites.

By Bob Wallace
Senior Editor

RALEIGH, N.C. — Already known as "First in Flight," North Carolina recorded another first last week when it announced plans to become the first state to build its own Asynchronous Transfer Mode (ATM)-based network.

Under the $160 million North Carolina Information Highway project, three local exchange carriers will soon begin building a nine-city ATM backbone that will eventually link 3,400 sites, ranging from world-class research and development facilities to small rural schoolhouses.

"We needed to build a network that could economically support access from any point of the state to a myriad of high-bandwidth applications — a network that could be used by the masses," said Alan Blatecky, a director of the advanced networking center at MCNC, a network design firm that helped develop the network plan. "We're on the way to achieving that goal."

The state of North Carolina joins Citicorp, GPU Services Corp., Hughes Aircraft Co. and the University of Miami on the list

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AT&T to introduce billing package at ICA ComNet '93

By Bob Wallace
Senior Editor

DALLAS — AT&T will announce this week a software package that beta users say is a powerful tool for manipulating billing data for some of AT&T's most widely used services.

The AT&T Billing Edge package enables users to process call detail and billing information the carrier will begin providing on diskette or compact disc next month. The software runs on DOS-based personal computers equipped with at least an Intel Corp. 80386-based processor and is designed to help network managers in billback applications and in containing-calling costs.

"The package is mouse-driven and incredibly simple to use," said Donn Greiner, a telecommunications analyst with United Services Automobile Association, a San Antonio, Texas-based insurance firm that has been beta testing AT&T Billing Edge for its 2,533-site AT&T Software-Defined Network since January. "Users are going to love this little package."

Information on diskette and CD is easier to work with than the data provided on magnetic tape

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Briefs

VINES goes to IBM. Following announcements of VINES on Hewlett-Packard Co. and Sun Microsystems, Inc. platforms, Banyan Systems, Inc. this week is expected to announce that it is partnering with IBM to port the VINES network operating system to IBM's RISC System/6000 platform. Banyan executives stated that the company expects to have VINES ported to all major Reduced Instruction Set Computing-based platforms by the end of this year.

IBM, Microsoft to make amends? IBM's new chief executive officer, Louis Gerstner, and Microsoft Corp.'s chairman and chief executive officer, Bill Gates, are reportedly planning to hold informal meetings in the coming months. The companies played down the significance of the meetings and declined to give specifics on what would be discussed. Analysts said if the former allies can combine efforts as they did in the 1980s with OS/2 and DOS, they could speed the development of distributed computing environments by two years.

Wanted: Comments on Clipper. The Computer Systems Security and Privacy Advisory Board, the group charted to advise Congress on security issues, is seeking comments from business users and industry on the proposed Clipper Chip encryption standard and related cryptography issues such as export controls. The board, which will meet June 2 at the National Institute of Standards and Technology (NIST), requests that comments be mailed to it in Room B-127 at NIST in Gaithersburg, Md. 20899 or faxed to (301) 948-1784 by May 27. For more information, contact Lynn McNulty at (301) 975-3240.

Radio spectrum — going once . . . Legislation that would allow the U.S. government to auction radio spectrum through a competitive bidding process was passed by the House Energy and Commerce Committee last week and will come up for a vote later this summer in the House. Rep. Edward Markey (D-Mass.) said his spectrum auctioning bill could raise $7 billion for the Department of the Treasury.

More links to Notes. WordPerfect Corp. last week announced plans to work with Lotus Development Corp. to integrate WordPerfect's Office 4.0 and InForms 1.0 products with Lotus Notes. WordPerfect will use the Vendor Independent Messaging standard to allow WordPerfect Office users to exchange messages with Notes users. The InForms product, which allows users to design forms-based work flows, will support Notes databases. The WordPerfect products are due out this spring.

MCI to provide cellular Vnet access. MCI Communications Corp. last week announced that it has begun offering cellular access to its Virtual Network (Vnet) service. Vnet Cellular Service supports either seven- or 10-digit uniform dialing plans and optional features including accounting codes. Subscribers who roam outside their service area must use the Vnet calling card or a special 800 number to access their Vnet. MCI charges the same rate for cellular and terrestrial calls.

Dropping like stones. Network Equipment Technologies, Inc. last week announced price reductions of as much as 40% across its entire line of Asynchronous Transfer Mode products, including the ATMX switch and ATMX Adapter Card. The 16-port switch now costs $2,700 per port, while the adapter card for Sun Microsystems, Inc. SPARCstations has been reduced to $2,500.

CONTACTS

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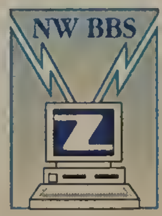

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APPN, E-net support shores up IBM 3174 controller

Gives SNA users more net configuration options.

By Michael Cooney and Maureen Molloy
Network World Staff

RESEARCH TRIANGLE PARK, N.C. — IBM will announce at International Communications Association ComNet '93 this week new Ethernet support and improved APPN capabilities for its venerable 3174 communications controller family.

IBM confirmed that the announcement will include new 3174s with integrated Ethernet support and an Ethernet board that will fit into existing 3174s. Also on tap is a new release of the box's Configuration Support software that will handle full Advanced Peer-to-Peer Networking communications. With the announcements, IBM will make good on promises it made last year (*NW,* Nov. 30, 1992, page 9).

The enhancements will give Systems Network Architecture users increased network configuration options while providing a smooth upgrade path to APPN.

"[The Ethernet feature] extends the longevity of the 3174 and allows users to have more freedom in terms of what they can connect it to," said Frank Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C. "It is one of those missing features IBM should've fixed a long time ago."

By adding APPN, IBM is telling SNA users employing Ethernet that they will not be left out of the APPN revolution, added Tom Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J.

Ethernet support is key for the 3174 because IBM's major competitors, such as McDATA Corp., already support it in their 3174-compatible offerings, analysts said. With the support, 3270 and ASCII users will be able to access SNA or Transmission Control Protocol/Internet Protocol hosts simultaneously.

According to Dzubeck, the new Ethernet support will bring with it full support of TCP/IP Telnet sessions. The 3174 currently supports Telnet sessions via 3174 TCP/IP Telnet Licensed Internal Code, which is available only as a Request Price Quotation product. Telnet support will let 3270 and ASCII terminals linked to the 3174 establish Telnet sessions to multiple IBM or non-IBM TCP/IP host applications.

IBM has said in the past that its Telnet support will include TN3270, which gives 3270 users full-screen access to TCP/IP applications.

The ramped up support for APPN Network Node (NN) on the 3174 will let the controller become a full participant in APPN nets. "The support will ease the concern of many users who had been wondering how IBM would bring the controllers into the APPN world," Nolle said.

APPN is IBM's strategic peer-to-peer networking technology. It is made up of NNs, which control routing and directory functions, and End Nodes, which are server or client nodes at the periphery of the net.

Today, a 3174 NN can use APPN to communicate only with another 3174 NN over a Token-Ring local-area network. Or, with 3174 Peer software, personal computers linked to the 3174 by coaxial cable can communicate with one another over Token Rings without involving the mainframe.

Full APPN NN support will let the 3174 communicate as a peer to any other NN, including OS/2 and Application System/400 machines plus the 6611 router.

When APPN support on the mainframe comes out this summer, a 3174 configured as an NN will be able to dynamically pick the best route for SNA data to flow, control pacing and prioritize traffic.

The new APPN support will also work hand-in-hand with another planned 3174 microcode enhancement, dubbed dependent LU Server/Requestor (dlS/dlR), which will support 3270 traffic in an APPN net. The dlS/dlR capability requires a VTAM enhancement that is expected to be released next year.

Pricing and availability were not available. ☐

Rabbit eases multiprotocol traffic mgmt.

By Michael Cooney
Senior Editor

PHOTO © 1993 EUGENE MOPSIK

Charles Root, Charles Robins, Peter Craine (l. to r.)

MALVERN, Pa. — Rabbit Software Corp. is set to roll out a combination gateway/router that promises to provide an efficient way to ship multiprotocol LAN traffic to hosts on SNA or TCP/IP backbones.

The Angora Enterprise Gateway combines the functions of multiple protocol-specific gateways and low-end routers on one platform that can be managed by industry-standard Simple Network Management Protocol managers or existing NetView host-based platforms.

"Gateways are usually distinctly configured to handle one protocol, are located in a remote area of the network and are not easy to manage," said Charles Robins, senior vice president of development for Rabbit. "Angora changes the gateway's traditional role."

The Angora gateway is software that will run on a variety of Unix platforms, including those from Hewlett-Packard Co., IBM, The Santa Cruz Operation, Inc. and Univel. The initial release will support Intel-based hardware, but future versions will support Reduced Instruction Set Computing-based machines.

Angora sits atop the Systems Network Architecture backbone between multivendor personal computer local-area network users and the mainframe, giving LAN users access to SNA hosts or to Transmission Control Protocol/Internet Protocol nets.

It supports Rabbit's line of DOS, Windows, Macintosh and Unix 3270 emulators, and any other third-party emulators running in PCs on token-ring or Ethernet LANs.

"The Angora is a chameleon-

(continued on page 6)

IBM thunders into remote LAN access

By Michael Cooney
Senior Editor

AUSTIN, Texas — IBM last week announced its first remote LAN access software — a package dubbed Thunderbird that gives mobile users of OS/2 and Windows a variety of options for working with LANs over switched links.

Thunderbird, which was expected, includes components for the remote workstation and the local-area network server (*NW,* March 8, page 1). The workstation application can run on OS/2 2.0 or higher, or Windows 3.1 and above. The server must run OS/2 2.0 or higher.

The remote workstation software lets the user dial into a work group server on a token-ring or Ethernet LAN over Integrated Services Digital Network, X.25 asynchronous or synchronous wide-area services.

The remote user does not need a token-ring or Ethernet adapter, though a modem is required.

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Firms whack WAN costs via dial-up routing features

By Skip MacAskill and Maureen Molloy
Network World Staff

Microcom, Inc. and Wellfleet Communications, Inc. last week announced dial-up support for their bridge/router products that is designed to reduce the cost of remote internetworking.

Both vendors are seeking to minimize wide-area routing costs with new dial backup, dial-on-demand and bandwidth-on-demand capabilities. Wellfleet announced a two-phase approach to provide dial-up support on its entire line of routers, as well as support for Integrated Services Digital Network services.

Microcom unveiled Microcom Bridge/Router (MBR) Version 7.0, enhanced remote software for its circuit-switched MBR/6000 and packet-switched MBR/6500 products that helps eliminate the need for additional leased lines.

Wellfleet's routers are now equipped with V.35 and RS-232 interfaces that let them interoperate with an external channel service unit (CSU) that triggers the switched connection.

The company plans to outfit the devices with signaling capabilities, such as V.25bis, that will enable them — not the CSU — to initiate, monitor and terminate dial connections.

This native signaling intelligence in the router will provide three key capabilities, including dial backup, which lets the router sense when a wide-area net link has failed and instruct the external CSU to establish a dial connection. That can obviate the need for backup leased lines.

Signaling capabilities will also let the router support bandwidth on demand, enabling the router to use dial-up lines to handle overflow traffic on private lines. The router would monitor the leased line and, if traffic exceeds user-defined parameters, a dial-up connection would automatically be initiated and traffic balanced across the links. When volume returns to normal, the dial-up connection is automatically terminated.

> Signaling capabilities will let the router support bandwidth on demand, enabling the router to use dial-up lines to handle overflow traffic.
>
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Signaling support also enables dial on demand, which lets users employ dial-up facilities as their primary WAN link. The router would establish switched connections on an as-needed basis based on user-defined triggering parameters such as the time of day.

These abilities will be available in September as part of Wellfleet's 7.60 software version.

In Phase 2, Wellfleet will also unveil an internal ISDN Basic Rate Interface and Primary Rate

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Addendum: Due to a production error, Xyplex, Inc. was omitted from the entry forms for *Network World's* Enterprise Technology Awards in the hub, bridge and router categories. To vote for Xyplex, enter the company's name in the field marked "Other."

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Oracle, IBM foray into new markets

By Bob Brown
Senior Editor

Some of the biggest players in the world of corporate IS last week positioned their products to serve a whole new category of consumers through a whole new class of multimedia services made possible by the convergence of computing and communications technologies.

In a move that came as no surprise, Oracle Corp. and US West, Inc. revealed plans to provide multimedia information services, such as video on demand, to businesses, consumers and schools in the regional Bell holding company's service area. Although the companies made a lot of noise about the partnership, they shed little light on exactly what they plan to provide and when.

At the same time, IBM and Blockbuster Entertainment Corp. said they would join forces to develop new methods for distributing videos and music to customers via networks.

Other large firms have been hustling lately to take advantage of the computing, communications and consumer electronics merger. Case in point: Time Warner Cable, which will install an AT&T Asynchronous Transfer Mode switch to support interactive television services (*NW*, April 19, page 1).

Observers said network man-

(continued on page 61)

NCR releases new mgmt. app, board-level router

By Jim Duffy
Senior Editor

DAYTON, Ohio — NCR Corp. last week brought out a new version of its Computer Manager systems management application that reduces the flow of management data across user nets and fosters tighter integration with the vendor's StarSentry management platform.

NCR also unveiled a bridge/router card, codeveloped with Cisco Systems, Inc., for Micro-Channel bus personal computers.

Computer Manager is an application that runs on top of StarSentry, which operates on NCR's System 3000 processors. It gathers alert, alarm and event information from management agents on AT&T, Hewlett-Packard Co., IBM, NCR and Unisys Corp. systems, and takes corrective action.

> NCR will unveil intelligent management agents that eliminate polling.
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Version 3.5 of Computer Manager supports two new adjunct applications — one that allows users to schedule management information query and retrieval and another that enhances its ties to StarSentry.

The first application, Distributed Scheduler, allows users to define when management data should be automatically sent to the central StarSentry console from remote managed workstations. This reduces polling, which saves users money by reducing the number of system calls to those systems.

Later this year, sources said, NCR will unveil intelligent management agents that eliminate polling by passing information to a StarSentry console based on events that approach predefined thresholds. The event-driven agents will also support local management of networked systems for common problems such as disk space utilization, CPU performance and memory usage, they said.

NCR declined to comment on the agents.

The Computer Manager's other new application, called Integration Utility, allows systems that are managed by Computer Manager 3.5 to be represented as icons on the StarSentry graphical user interface. They are displayed on a topological map of the enterprise network along with icons representing other managed nodes

Computer Manager 3.5 costs $11,000. The Distributed Scheduler application costs an additional $340 per agent, and the Integration Utility is an added $1,000. The products will be available in June.

NCR's StarWAN Model 110 bridge/router card is an add-on board for MicroChannel PCs designed to link small Ethernet and token-ring work groups into local-area network internets.

The StarWAN 110 performs all

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Rabbit eases traffic mgmt.

continued from page 4

like gateway in that it can act like and support multiple third-party gateways," Robins said. "Users don't have to buy individual gateways for each protocol they need to support."

In its first release, Angora supports as many as 1000 sessions with a mainframe, but that will be ramped up in future releases of the gateway. Traditional SNA gateways have been limited to 254 sessions with a host.

Wide-area connectivity is provided by Rabbit's Rb-15 and Rb-16 communications cards. The Rb-15 supports a V.35 interface, one 64K bit/sec link and one 19.2K bit/sec link for Synchronous Data Link Control or Qualified Logical Link Control/X.25 links. The Rb-16 will support V.35 and X.21 interfaces at up to T-1 speeds. Future releases will support frame relay and Integrated Services Digital Network.

Angora will also be capable of routing TCP/IP data over an SNA or X.25 backbone to remote sites. Rabbit will use the standard proposed by IBM to the Internet Engineering Task Force for routing TCP/IP over SNA.

Future releases will support Network Basic I/O System and Novell, Inc. Internetwork Packet Exchange (IPX) routing over SNA, X.25, frame relay and ISDN nets.

"This isn't designed as a high-speed router, and we haven't done any throughput measurements yet," said Robert Oliver, director of technical marketing for Rabbit. "It does eliminate the need for users to purchase a separate low-end router to get traffic to and from remote sites."

> "We think it's going to be the mother of all gateways," said Veschi.
>
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The Angora gateway can be monitored and controlled via IBM's NetView network management platform or any industry-standard SNMP manager, such as IBM's NetView/6000 and HP's OpenView.

Mother of all gateways

Users are looking forward to beta-testing Angora. "The fact that we can support multivendor gateways from one platform will save us a lot of headaches," said Robert Veschi, group vice president at I-NET, Inc., a Bethesda, Md., systems integration firm. "We think it's going to be the mother of all gateways."

Angora could compete with Eicon Technology Corp.'s recently announced InterConnect Server, which is touted as an inexpensive gateway/router for remote sites seeking access to SNA and TCP/IP backbones (*NW,* Feb. 22, page 1).

A primary difference between the two is that the Eicon box is designed for remote offices, while the Angora is positioned to reside in the data center to route incoming LAN traffic to its proper destination. Another difference is price — the Eicon box costs no more than $5,000, whereas a fully configured Angora may run well over $35,000 just for the software.

Angora is expected to hit beta sites by the end of the summer. Pricing for the product has not yet been set, but Oliver said it will start between $3,000 and $5,000 and scale up, depending on the number of sessions the user needs.

Rabbit: (215) 647-0440. ◘

Cisco eases control of net

continued from page 1

ent in supporting multiple protocols.

Cisco developed IGRP in 1987 to overcome the shortcomings of the older TCP/IP Routing Information Protocol (RIP) standard. IGRP, which is used in about 80% of Cisco networks today, improved on RIP by adding support for larger networks, optimal routing based on variables such as the least expensive path, and the ability to route around failed links faster — three minutes vs. seven for RIP.

The company's Enhanced IGRP will enable users to route around net failures in about 30 seconds, bringing it on par with the 30- to 40-second convergence average for OSPF, a standard announced two years after the birth of IGRP that addresses many of the same problems with RIP.

Convergence is the time it takes for routers to detect that a link has gone down, determine an alternate path and reflect the changes in new routing tables. That is key in minimizing network disruptions.

Todd Dagres, vice president of data communications at the Boston-based The Yankee Group, said IGRP performance was its key weakness relative to OSPF. Enhanced IGRP is particularly important since about 500 of the top U.S. firms' multiprotocol router nets use IGRP, he said.

Jay Batson, an analyst at Forrester Research, Inc., agreed, saying quick convergence is especially important for IBM Systems Network Architecture data traveling across a multiprotocol backbone.

"SNA demands predictable response times, so having a three-minute reconvergence time presents a serious problem," Batson said. "Since Cisco's strategy is to support SNA via TCP/IP encapsulation, it's important that their routers provide near instantaneous convergence."

The Enhanced IGRP software will be available in mid-1994.

Enhanced interoperability

Cisco also plans to add what it calls a redistribution function that will enable IGRP routers to accept and forward data received from OSPF routers, enabling users to deploy IGRP and OSPF routers in the same net.

The company will enhance its OSPF support by adding policy routing capabilities, enabling Cisco users to specify routing preferences when mixing OSPF with other protocols such as RIP, IGRP and Integrated IS-IS.

It will also broaden OSPF's wide-area networking capabilities by adding support for OSPF over Switched Multimegabit Data Service nets.

Cisco said it will add a so-called Bounded Router Update to IGRP, which will let the user dynamically designate the internet domain to which a router belongs. This contrasts with OSPF, which requires that this designation be changed manually.

Area border algorithms allow an internet to be partitioned into subdomains to localize traffic, reducing cross-enterprise traffic and boosting security. An area border router condenses the topological information for routers in its domain and passes the information to other area border routers via a predefined link. That allows the user to increase network size without exceeding the routing protocol's capacity.

Cisco said it will also improve its IS-IS protocol, enabling it to support the routing of Transmission Control Protocol/Internet Protocol and DECnet traffic. IS-IS is the router-to-router protocol for the Open Systems Interconnection's Connectionless Network Layer Protocol (CNLP).

Giving IS-IS the ability to simultaneously handle CLNP, TCP/IP and DECnet reduces the complexity of managing a net by enabling a single interrouter protocol to transmit three transport protocols.

The OSPF and IS-IS enhancements will be available early next year.

Cisco: (415) 326-1941. ◘

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A Blooming Success in Datacomm: UDS Custom Modems for FTD

FTD had a datacomm problem—a conflict between the economics of sticking with installed equipment and the benefits of improving technology for new installations.

FTD solved the problem by contacting UDS—for a custom-designed modem that resolved the conflict.

UDS calls it the V.22b/202. FTD calls it the Mercury 3000. By either name, it's a single data communications unit housing both a FasTalk V.22 *bis* and a 202 modem. An on-board microcontroller connects either modem to the telephone interface as appropriate. To date, FTD has installed some 8,000 units in its dial-up data network, where they perform store-and-forward order processing for retail florists across the U.S. and Canada.

The moral: if your datacomm problem doesn't conform to the capabilities of a "standard" modem, UDS will custom design a device that fills the bill. The capability that has successfully fielded more than 5000 custom designs is available to you. For a special floral arrangement, call FTD. For a special datacomm arrangement, call

800/451-2369

UDS

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Is this your Business Address? **Yes** ☐ **No** ☐
Please Answer ALL Questions, Sign and Date the Form.

1 Industry: (check one only)

01. ☐ Manufacturers (other than Computer/Communications)
02. ☐ Finance/Banking
03. ☐ Insurance
04. ☐ Real Estate
05. ☐ Healthcare Services
06. ☐ Legal
07. ☐ Hospitality
08. ☐ Retail/Wholesale Trade/Business Services
09. ☐ Transportation
10. ☐ Utilities
11. ☐ Education
12. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
13. ☐ Government, State/Local
14. ☐ Government, Federal
15. ☐ Military
16. ☐ Aerospace
17. ☐ Consultants (Independent)
18. ☐ Carriers
19. ☐ Interconnects
20. ☐ Manufacturers (Computer/Communications)
21. ☐ VAR/VAD/VAN/ Systems Houses
22. ☐ Distributors, Computer Related
23. ☐ Distributors, Communications Related
24. ☐ Other____________________

2 What is your job function? (check one only)

NETWORKING MANAGEMENT
1. ☐ Networking Mgmt. 3. ☐ Datacom/Telecom Mgmt.
2. ☐ LAN Mgmt. 4. ☐ Engineering Mgmt.

MIS MANAGEMENT
5. ☐ MIS, IS, IT Mgmt. 6. ☐ Engineering Mgmt.

CORPORATE MANAGEMENT
7. ☐ Corporate Mgmt. (CIO, CEO, Pres., VP, Dir., Mgr., Financial Mgmt.)
8. ☐ Consultant (Independent)
9. ☐ Other____________________

3 My responsibilities include: (check one only)

1. ☐ LANs/ Internetworking/ WANs 3. ☐ LANs 5. ☐ None
2. ☐ LANs/ Internetworking 4. ☐ WANs

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+ 3. ☐ 20 - 49 5. ☐ 2 - 9 7. ☐ None
2. ☐ 50 - 99 4. ☐ 10 - 19 6. ☐ 1

5 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. Scope (check one only)
1. ☐ Corporatewide
2. ☐ Multienterprise (consultants)
3. ☐ Departmental

B. Involvement (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ None (A or B)

6 Check all that apply in Columns A and B:

A: I am involved in the purchase of the following products/services.
B: I plan to purchase the following products/services in the next year.

Involved / Plan to Purchase

A B **LOCAL-AREA NETWORKS**
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ LAN Servers
☐ 03. ☐ LAN Operating Systems Software
☐ 04. ☐ Superservers
☐ 05. ☐ Data Base Servers (Oracle, Sybase, etc).
☐ 06. ☐ Terminal Servers
☐ 07. ☐ LAN Services
☐ 08 ☐ LAN Storage Devices (optical, tape, disk, etc,. including backup systems)
☐ 09. ☐ Network Test Equipment
☐ 10. ☐ Hubs
☐ 11. ☐ Cables, Connectors, Baluns
☐ 12. ☐ UPS
☐ 13 ☐ Network Adapter Boards
☐ 14. ☐ Peer-to-Peer LANs
☐ 15. ☐ Wireless LANs
☐ 16. ☐ SNMP Network Management
☐ 17. ☐ ATM (Asynchronous Transfer Mode)

A B **INTERNETWORKING**
☐ 18. ☐ Bridges
☐ 19 ☐ Routers
☐ 20. ☐ Gateways
☐ 21. ☐ Bridge/Routers
☐ 22. ☐ Hubs
☐ 23. ☐ Intelligent Hubs
☐ 24. ☐ Communications Servers

Involved / Plan to Purchase

A B **COMPUTERS/PERIPHERALS**
☐ 25. ☐ Micros/PCs
☐ 26. ☐ Minis
☐ 27. ☐ Mainframes
☐ 28. ☐ Pen-Based
☐ 29. ☐ Laptops
☐ 30. ☐ Workstations
☐ 31. ☐ Image Processing Workstations
☐ 32. ☐ Front-End Processors
☐ 33. ☐ Terminals
☐ 34. ☐ Printers
☐ 35. ☐ Cluster Controllers
☐ 36. ☐ Fax Machines
☐ 37. ☐ X-Terminals

A B **SOFTWARE/APPLICATIONS**
☐ 38. ☐ Network Management
☐ 39. ☐ Micro to Mainframe
☐ 40. ☐ Security
☐ 41. ☐ Communication/Terminal Emulation
☐ 42. ☐ Word Processing
☐ 43. ☐ Operating Systems
☐ 44. ☐ Business Applications (Finance/Mfg/HR)
☐ 45. ☐ Applications Development
☐ 46. ☐ Data Base Management
☐ 47. ☐ Spreadsheet
☐ 48. ☐ Groupware
☐ 49. ☐ EDI
☐ 50. ☐ E-Mail
☐ 51. ☐ Windows/Graphical User Interface
☐ 52. ☐ 4GL/Development
☐ 53. ☐ Multimedia
☐ 54. ☐ Graphics
☐ 55. ☐ Utilities

A B **WIDE-AREA NETWORK EQUIPMENT/SERVICES**
☐ 56. ☐ Modems (9.6K bps and over)
☐ 57. ☐ Modems (under 9.6K bps)
☐ 58. ☐ T-1
☐ 59. ☐ T-3
☐ 60. ☐ Fractional T-1
☐ 61. ☐ Data Switches
☐ 62. ☐ SMDS
☐ 63. ☐ ATM (Asynchronous Transfer Mode)
☐ 64. ☐ Matrix Switches
☐ 65. ☐ Packet Switches
☐ 66. ☐ Protocol Converters
☐ 67. ☐ Diagnostic/Test Equipment
☐ 68. ☐ DSU/CSUs
☐ 69. ☐ Microwave
☐ 70. ☐ Fax Boards/Modems
☐ 71. ☐ VSAT
☐ 72. ☐ Fiber Optic
☐ 73. ☐ Satellite
☐ 74. ☐ ISDN
☐ 75. ☐ PBXs (over 1000 lines)
☐ 76. ☐ PBXs (under 1000 lines)
☐ 77. ☐ Automatic Call Distributors
☐ 78. ☐ Voice Messaging Systems
☐ 79. ☐ Videoconferencing Systems
☐ 80. ☐ Voice Response/Processing
☐ 81. ☐ Switched Voice
☐ 82. ☐ Dedicated Leased Line
☐ 83. ☐ Switched Data
☐ 84. ☐ Centrex
☐ 85. ☐ E-Mail/On-Line Information
☐ 86. ☐ Image Processing
☐ 87. ☐ Audio Teleconferencing
☐ 88. ☐ Local Services
☐ 89. ☐ WATS MTs
☐ 90. ☐ International
☐ 91. ☐ Virtual Networks
☐ 92. ☐ Frame Relay
☐ 93. ☐ Value Added Services
☐ XX ☐ None of the above (1-93)

7 What is the total number of A: LANs B: Workstations/Nodes in your entire organization?

	LANs A		Workstations/ Nodes B
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	9 or Less	☐

8 Which of the following network platforms are currently installed/planned in the next year?

NETWORK ARCHITECTURES
Present Planned
☐ 01. ☐ SNA
☐ 02. ☐ DECNET
☐ 03. ☐ MAP/TOP
☐ 04. ☐ TCP/IP
☐ 05. ☐ DCA (Unisys)
☐ 06. ☐ X.25

Present Planned
☐ 07. ☐ NOVELL IPX/SPX
☐ 08. ☐ APPC/APPN/LU 6.2
☐ 09. ☐ NETBIOS
☐ 10. ☐ OSI
☐ 11. ☐ APPLETALK
☐ 12. ☐ OTHER____________________

LAN OPERATING SYSTEM
☐ 13. ☐ LOCALTALK (APPLETALK)
☐ 14. ☐ BANYAN (VINES)
☐ 15. ☐ DCA (IRMALAN)
☐ 16. ☐ DCA (10-NET)
☐ 17. ☐ IBM (LAN SERVER)
☐ 18. ☐ IBM (PC LAN PROGRAM)
☐ 19. ☐ MICROSOFT (LAN MANAGER)
☐ 20. ☐ UNGERMANN-BASS (NET/1)
☐ 21. ☐ NOVELL (NETWARE, 2.X, 3.X, 4.X)
☐ 22. ☐ PROTEON (PRONET)
☐ 23. ☐ SITKA (TOPS)
☐ 24. ☐ 3COM (3+, 3+OPEN)
☐ 25. ☐ ARTISOFT (LANTASTIC)
☐ 26. ☐ HAYES (LANSTEP)
☐ 27. ☐ DEC (PATHWORKS)
☐ 28. ☐ OTHER____________________

LAN ENVIRONMENT
☐ 29. ☐ 4M TOKEN RING
☐ 30. ☐ 16M TOKEN RING
☐ 31. ☐ ARCNET
☐ 32. ☐ ETHERNET
☐ 33. ☐ STARLAN
☐ 34. ☐ FDDI
☐ 35. ☐ LOCALTALK
☐ 36. ☐ 10BASE-T
☐ 37. ☐ OTHER____________________

OPERATING SYSTEM
☐ 38. ☐ DOS
☐ 39. ☐ UNIX/XENIX/AIX
☐ 40. ☐ OS/2
☐ 41. ☐ OS/2 2.X
☐ 42. ☐ MVS
☐ 43. ☐ VM
☐ 44. ☐ VMS
☐ 45. ☐ MACINTOSH
☐ 46. ☐ WINDOWS
N/A 47. ☐ WINDOWS NT
☐ 48. ☐ X WINDOWS
☐ 49. ☐ OTHER____________________

9 For which areas outside of the U.S. do you have purchase influence? (check all that apply)

1. ☐ Europe 4. ☐ Australia
2. ☐ Asia 5. ☐ Middle East
3. ☐ South America 6. ☐ None

10 Which of the following hardware platforms is installed/planned in your company? (check all that apply)

	Mainframes Currently Installed	Planned Next Year	Minis Currently Installed	Planned Next Year
01. DEC	☐	☐	☐	☐
02. IBM	☐	☐	☐	☐
03. AMDAHL	☐	☐	☐	☐
04. AT&T	☐	☐	☐	☐
05. BULL HNIS	☐	☐	☐	☐
06. DATA GENERAL	☐	☐	☐	☐
07. HP	☐	☐	☐	☐
08. TANDEM	☐	☐	☐	☐
09. UNISYS	☐	☐	☐	☐
10. OTHER____________	☐	☐	☐	☐

MICROCOMPUTERS
(fill in the numbers)

	NUMBER INSTALLED	NUMBER PLANNED NEXT YEAR
11. MACINTOSH 20, 30, 40		
12. MACINTOSH OTHER		
13. PCs BASED ON 80586	N/A	
14. PCs BASED ON 80486		
15. PCs BASED ON 80386		
16. PCs BASED ON 80286		
17. PCs BASED ON 8086/8088		
18. RISC / UNIX BASED WKSTNS		
19. OTHER		

11 Estimated value of networking equipment and services:

A. Which you helped specify, recommended or approved in the last year?
B. Which you plan to help specify, recommend or approve in the next year?

A B
☐ 1. ☐ $100 million and over
☐ 2. ☐ $50 - $99.9 million
☐ 3. ☐ $25 - $49.9 million
☐ 4. ☐ $20 - $24.9 million
☐ 5. ☐ $10 - $19.9 million
☐ 6. ☐ $5 - $9.9 million
☐ 7. ☐ $1 - $4.9 million
☐ 8. ☐ $500,000 - $999,999
☐ 9. ☐ $499,999 or less

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ Over $10 billion 5. ☐ $50 to $99.9 million
2. ☐ $1 to $9.9 billion 6. ☐ $10 to $49.9 million
3. ☐ $500 to $999.9 million 7. ☐ $5 to $9.9 million
4. ☐ $100 to $499.9 million 8. ☐ $4.9 million or less

13 Estimated number of employees for your entire corporation:

1. ☐ Over 10,000 4. ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999 5. ☐ 500 - 999
3. ☐ 2,500 - 4,999 6. ☐ 499 or less

9226

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DATA NET ARCHITECTURES

NETWORK ARCHITECTURES, DATA NETWORK EQUIPMENT, STANDARDS AND ENTERPRISE NETWORK MANAGEMENT

Worth Noting

> "NetView as a premier network management platform has become pretty much incidental with the introduction of NetView/6000. IBM has never successfully let NetView manage LANs, and now it will haunt them."
>
> **Atul Kapoor**
> Principal
> Kaptronix, Inc.
> Haworth, N.J.

Data Packets

For a limited time, **IBM** 3174 controller users can receive a 30% discount on upgrades to any existing 3174 equipment.

Upgrade orders must be placed before Sept. 13, and delivery must be made no later than Oct. 13.

The upgrade sale must be made through IBM's National Telesales Center, which can be reached at (800) 426-3346, Ext. 106D.

Start-up **LANserve** of Pleasanton, Calif., last week announced Windows software that lets personal computer local-area network users access Digital Equipment Corp. VAXes and IBM mainframes for data storage and retrieval.

Hyperstore for Windows resides on any Windows PC using the Transmission Control Protocol/Internet Protocol as a transport protocol. It does not require additional software on the mainframe other than File Transfer Protocol support.

Hyperstore will be available by the end of the month for $400.

LANserve: (510) 846-8636.

McDATA adds fiber-optic converter to ESCON line

Rollout is first non-IBM ESCON converter to mart.

By Michael Cooney
Senior Editor

BROOMFIELD, Colo. — McDATA Corp. last week rolled out an IBM ESCON-compatible fiber-optic converter that will let traditional bus-and-tag networking equipment work with emerging IBM fiber-optic mainframe channels.

The McDATA LinkMaster 9134, the first non-IBM Enterprise System Connection converter on the market, promises to deliver a smaller, less expensive alternative to IBM's 9034 ESCON Converter.

ESCON is IBM's high-speed fiber-optic channel architecture. ESCON converters let existing bus-and-tag equipment with parallel interfaces, such as communications controllers and direct access storage devices, connect to the serial interfaces used with ESCON fiber-optic mainframe channels.

Without the converters, users would have to replace existing communications equipment with new equipment outfitted with ESCON interfaces.

ESCON supports channel speeds of 10M byte/sec, whereas bus-and-tag equipment operates at 4.5M byte/sec. With ESCON's Extended Distance Feature (XDF), the ESCON channel can operate at 17M byte/sec.

ESCON also extends the maximum distance between a controller or peripheral device and a mainframe from 400 feet to almost 2 miles, giving users increased net configuration options. With XDF, distances between controllers and the mainframe can be almost 26 miles.

With the McDATA 9134, users can attach a maximum of eight parallel bus-and-tag channel devices directly to the 9134, the same number that IBM's 9034 supports. The 9134 translates the parallel signals into serial and puts them onto the ESCON channel. The converter also compensates for the data speed differences between the two environments.

The converters can be located close to the parallel peripherals or centrally grouped in the data center, depending on how much bus-and-tag cable the user wants to replace, said Walt Hinton, product manager for McDATA.

The biggest difference between the IBM and McDATA offerings is price — the LinkMaster 9134 is available for $12,000, while the IBM 9034 sells for more than $15,000.

"We are providing users with a

(continued on page 12)

Eicon intros Unix-based gateways for SNA, OSI

By Michael Cooney
Senior Editor

MONTREAL — Eicon Technology Corp. last week introduced new Unix-based SNA and OSI gateways designed to give local-area network users improved access to IBM and non-IBM mainframes.

Systems Network Architecture LAN Gateway for Unix and Open Systems Interconnection LAN Gateway for Unix will let Eicon OS/2, Windows and DOS personal computers access IBM and non-IBM mainframes over Synchronous Data Link Control or X.25 wide-area links.

"The gateways give desktop users easy access to IBM and X.25 hosts through a Unix server for the first time," said Ron Grimes, product manager for Eicon.

The Eicon gateways consist of software and an EiconCard intelligent coprocessor card. The gateway software runs with The Santa Cruz Operation, Inc.'s SCO Unix System V Release 3.2, SCO Open Desktop or Unix System V Release 4 operating systems supporting Microsoft Corp.'s LAN Manager. The gateway can be located on either a token-ring or Ethernet LAN.

The software can support as many as four EiconCards on any nondedicated Unix workstation. Each EiconCard can support up to

(continued on page 12)

DEC distributes the distributed goods

Product	Description	Price
DCE run-time services	Provides access to other DCE services and resources across the network.	$235
DCE application developers' kit	Provides tools for development and debugging of distributed applications.	$590
DCE cell directory server	Naming and location services for applications, files and systems in network.	$2,360
DCE security server	Authentication and authorization services for applications; data integrity.	$2,360

All products run on DEC's Alpha hardware and will be available in July.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

DEC unwraps DCE for OSF/1, Alpha

Software will allow users to build DCE-based applications for distributed, multivendor nets.

By Jim Duffy
Senior Editor

MAYNARD, MASS. — Digital Equipment Corp. last week rolled out its first full-blown implementation of the Open Software Foundation, Inc.'s (OSF) Distributed Computing Environment (DCE), which will allow users to develop applications that work in a distributed, multivendor net.

DEC's DCE for the DEC OSF/1 operating system runs on the vendor's new 64-bit Alpha workstations and servers. Applications developed for DCE program interfaces can use DCE services, such as a remote procedure call (RPC), to access other DCE-compliant applications and resources, regardless of where they reside, according to the firm.

DCE for DEC OSF/1 is compliant with Version 1.0.2 of the OSF DCE, said Dottie Mamos, DEC's DCE marketing program manager. DCE for DEC OSF/1 consists of four components: run-time services, a cell directory server, a security server and an application developers' kit.

Run-time services are an integrated set of services that enable users to distribute and access all resources across the network. The services include an RPC runtime library, a cell directory service client, a distributed time service client and server, a security client and administrative tools.

The cell directory server provides a consistent means for naming and locating users' applications, files and systems within a DCE cell. A cell is a subnetwork, or domain, within an enterprise-wide network.

With the cell directory server, users and applications can locate distributed network resources without knowing where they physically reside, DEC said.

The cell directory server supports the X.500 standard for directory services, Mamos said, meaning it can access the directories of other X.500-compliant services.

The security server, which supports the Kerberos specification, ensures that only authorized users are granted access to data and services. It also authenticates passwords when users log on to the network.

The authentication and authorization features of the security server also ensure data integrity as information traverses the network, DEC said.

Lastly, the application developers' tool kit provides programmers with a C language-based tool for writing and debugging RPCs. The kit also includes sample applications and examples of how applications interact to help reduce development time.

DEC has been shipping a DCE Starter Kit for DEC OSF/1 and Ultrix systems during the past year. Unlike the Starter Kit, the new kit runs on the Alpha platform and includes the security server, which the Starter Kit does not, according to Mamos.

DCE for DEC's OpenVMS oper-

(continued on page 12)

Announcing the first network printer

Operating System	Topology
Novell Netware	*Ethernet/802.3 Token Ring (4/16 Mbps)
Microsoft® LAN Manager	*802.3 Token Ring (4/16Mbps)
Windows for Workgroups	*802.3 Token Ring (4/16 Mbps)
Windows NT	*802.3 Token Ring (4/16 Mbps)
IBM LAN Server	*802.3 Token Ring (4/16 Mbps)
AppleTalk	*LocalTalk *EtherTalk
HP-UX**	*Ethernet
SunOS**	*Ethernet
Solaris**	*Ethernet
SCO UNIX®	*Ethernet

*Standard in the HP LaserJet 4SI MX printer. **For operating HP-UX, SunOS or Solaris, a one-time purchase of $199 in configuration software is required. Adobe and PostScript are trademarks of Adobe Systems Inc. which may be registered in certain jurisdictions. Microsoft is a U.S. registered trademark of Microsoft Corporation. UNIX is a registered trademark of UNIX System Laboratories Inc. in the U.S.A. and other countries. †In Canada call 1-800-387-3867, Ext. 7299. ©1993 Hewlett-Packard PE12353

Multiple environments are no longer worlds apart. Even if you have Novell Netware on one network, HP-UX on another and EtherTalk on a third, the new HP LaserJet 4Si MX printer easily connects across platforms. Automatically.

The HP LaserJet 4Si MX printer comes out-of-the-box preconfigured for multiple environments. There's nothing more to do than plug-and-play. All interfaces are simultaneously hot, making switching so seamless, end-users won't even notice.

What's more, HP's LaserJet 4Si MX printer is ready to handle whatever needs come down the

that adapts to multiple environments.

pike. More operating systems? No problem. As your network system continues to evolve, the capabilities of this printer are no longer just impressive. They're indispensable.

The HP LaserJet 4Si MX printer is loaded with features that define state-of-the-art. HP's enhanced PCL5 and genuine PostScript™ Level 2 software from Adobe™ come standard. Printer environments are saved while switching. Setup is a cinch with network software utilities and drivers included in the box. And, if you need any reassurance about trouble-free operation, you have it in our Simple Network Management Protocol (SNMP) support.

At 17 ppm, this is the fastest LaserJet ever, with I/Os and RISC-based formatter capabilities matched to support its speed. It delivers impeccable 600 dpi print quality—thanks to HP's microfine toner and Resolution Enhancement technology. Plus, it comes standard with two 500 sheet input trays.

But what if you don't need the full capabilities of the HP LaserJet 4Si MX printer right away? HP offers another printer that's probably a perfect fit. The HP LaserJet 4Si printer delivers the identical 17 ppm performance and superb 600 dpi print quality. It also has room to grow. The two MIO expansion slots let you add HP JetDirect network interface or third party cards. And you can add on Adobe's genuine PostScript Level 2 software and SIMM memory modules, as you need them.

To find out more about the multiple-network HP LaserJet 4Si MX printer and the upgradable HP LaserJet 4Si printer just call 1-800-LASERJET, Ext. 7299.†
Capabilities this advanced make a world of difference—in any environment.

HEWLETT PACKARD

Circle Reader Service #8

DEC unwraps DCE for OSF/1, Alpha

continued from page 9

ating system will debut by year end, Mamos said. DEC is also developing a version to run on Microsoft Corp.'s Windows NT operating system.

DCE for DEC OSF/1, meanwhile, can interoperate with Microsoft's PC RPC through a so-called PC Proxy Agent, which allows a personal computer to access the DCE name service on an OSF/1 server and participate in a DCE network.

The Fox Chase Cancer Center in Philadelphia is using DEC's DCE to perform genetic mapping, which involves several computation-intensive tasks, according to Robert Stodola, manager of Fox's research computing services.

Genetic mapping applications can be partitioned into fewer processes, each of which would run on any available DEC processor in the network, Stodola said. "We are able to turn these things around a lot faster by using multiple processors," he explained. "We chose to do it this way because we thought it was a little cheaper than [installing] a multiprocessor [machine]."

Lab certified

DCE for DEC OSF/1 has been certified to interoperate with other vendors' DCE products by the OSF's Interoperability Laboratory in Cambridge, Mass., Mamos said. OSF opened that facility in February (*NW*, March 22, page 25).

Mamos would not say which vendors' DCE products DEC's was tested against. IBM is currently shipping DCE on its AIX systems; Hewlett-Packard Co. is shipping a DCE developers' kit; and Data General Corp. will ship DCE on its AViiON systems in July.

DEC's run-time services cost $235, while the cell directory server and the security server cost $2,360 each. The application developers' kit is priced at $590. All of the products will be showcased at OSF's Challenge '93 demonstration next week and will be available in July.

DEC will release a distributed file system for DCE for DEC OSF/1 by year end, Mamos said.

DEC: (800) 344-4825. ◘

McDATA adds ESCON fiber-optic converter

continued from page 9

less expensive ESCON migration tool," Hinton said.

The 9134 is also half the size of IBM's 9034, saving valuable data center space, he added. For example, two 9134s can fit in an industry-standard 19-in. rack. The IBM converter requires a special IBM rack, which is capable of holding only one 9034.

The 9134 announcement is McDATA's second stab at the ESCON market in recent months. In September, the firm announced the first ESCON-compatible cluster controller, the LinkMaster 7100 (*NW*, Oct. 12, 1992, page 11).

"As more applications become available on mainframes using ESCON links, we want to make the user transition from the bus-and-tag world to the ESCON environment as easy and inexpensive as possible," Hinton said.

McDATA: (303) 460-9200. ◘

Eicon introduces SNA, OSI gateways

continued from page 9

254 simultaneous SNA or X.25 host sessions at speeds of up to 384K bit/sec. Users can configure each card to communicate with two hosts simultaneously.

LAN workstations running Eicon's 3270 or 5250 emulation products, such as Access for Windows, Access for DOS and Access for OS/2, can connect to IBM or non-IBM hosts over SDLC or X.25 services via the SNA gateway.

Using the OSI gateway, these same LAN users and other asynchronous terminals can access ASCII host or remote OSI-based electronic mail and other information services. The OSI gateway supports a variety of OSI applications, such as X.400 mail and File Transfer, Access and Management (FTAM), Grimes said.

The SNA and OSI gateways can be installed in any combination on the Unix workstation, giving users access to SNA hosts, X.25 nets and other wide-area services through one box, according to Grimes.

"The gateways are good for users who have a lot of remote LAN traffic that needs to gain access to the central host via SNA/SDLC or X.25 services," he said.

The SNA and OSI LAN software gateways will be available in July for $1,495 each. The EiconCard sells for $995, while an Eicon high-speed interface card sells for $1,245.

Eicon: (514) 631-2592. ◘

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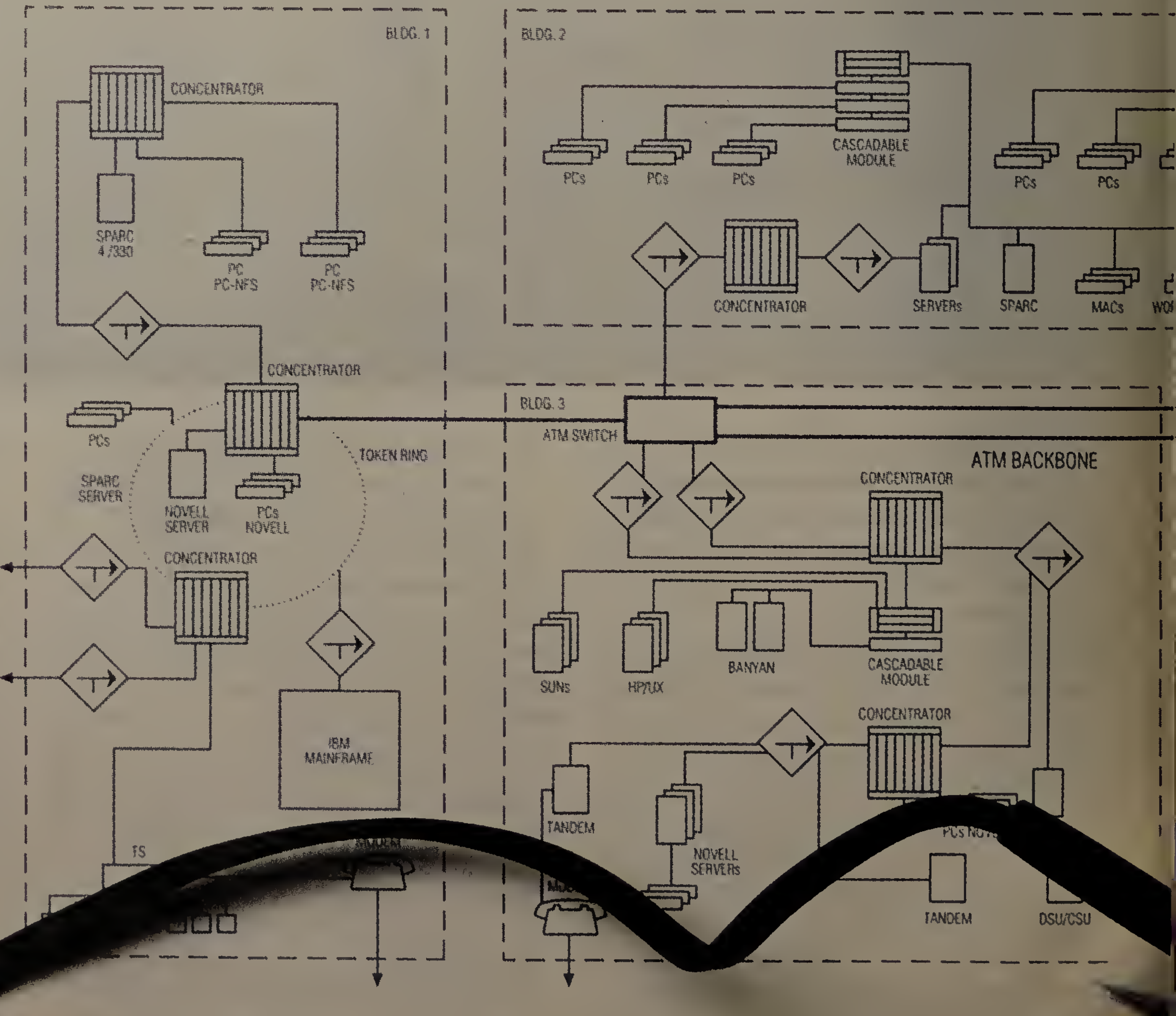

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Innovative mgmt. system relies on X.500

continued from page 2

be the Air Force Materiel Command.

"There have been a lot of network management systems put in place over time," representing a significant investment by large corporations, said Ron Strich, an SSDS executive vice president. "But there hasn't been an open systems approach to bringing together all the information gathered by these systems."

DESC turns management systems across a network into peers, said Mike Okulski, a senior engineer at SSDS.

"Before, you'd have one system managing one area and another managing a separate area, and they couldn't share data — even though fault isolation often involves looking at more than one location," he said. "When you plug a management system into the DESC architecture, it has access to all data the other management systems are plugging into DESC."

The heart of DESC is an Enterprise Information Base (EIB), a distributed information repository containing descriptions of all elements on SSDS' network, multiple views of those elements and the relationships between the elements. EIB maintains static data in an X.500 directory and dynamic device attributes in a distributed information base.

The X.500 and dynamic information bases run in tandem on Sun Microsystems, Inc. SPARCstations at SSDS sites here and in Dayton, Ohio, and will soon be running at an SSDS site in San Jose, Calif., as well.

The X.500 database, designed using software from the U.K.-based ISODE Consortium, is largely a storage facility for configuration data, which changes infrequently. Using X.500 not only allows for a corporatewide view of configuration data, but it also gives net managers access to data even if a device goes down — data that would not be available in a typical Simple Network Management Protocol scenario.

The distributed dynamic information base system, dubbed the DESC Distributed Agent (DDA), houses operational data, such as the status of routers and applications. The DDAs, designed by SSDS using Bridgeway Corp.'s EventiX software, provide an interface between the X.500 directory and SNMP management systems, which could not talk directly to X.500.

SSDS has designed proxy agents with the EventiX software to capture operational data from both SNMP and non-SNMP network devices. The proxy agents store data in the DDAs so it looks like SNMP data to the SNMP management systems, which query the DDAs to check the status of network devices. The DDAs mask non-SNMP devices from SNMP management systems and improve overall management performance by off-loading operational data from net management systems.

Management stations pull data from the "X.500 directory to draw wiring diagrams and use SNMP to overlay those maps with operational data," Okulski said.

Data in the EIB databases is accessible to three levels of management personnel — help desk attendees, network managers at management consoles and specialists, such as database administrators.

On SSDS' network, the EIB databases serve as common information repositories for Cabletron Systems, Inc.'s Spectrum, NetLabs, Inc.'s NetLabs/Manager and SunConnect's SunNet Manager — as well as SNMP management systems built by SSDS using the EventiX software.

Although SSDS' net is modest in size — covering 10 sites and about 200 networked devices — the systems integrator has gone out of its way to build a heterogeneous network to gain experience with the products its clients use. SSDS is using DESC to manage routers, applications on Unix workstations and other things.

SSDS: (303) 790-0660. ◘

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Casey Powell
President and CEO
Sequent Computer Systems, Inc.

Netnotes

Shiva Corp. entered the token-ring market last week with the release of LANRover/T for NetWare, a remote local-area network access product for Novell, Inc. NetWare LANs running over token rings.

The product is a hardware/software server, available in four- and eight-port versions, that attaches directly to the LAN. This means that as many as eight remote users can simultaneously dial into a NetWare LAN and access resources as if they were attached locally.

LANRover/T also comes with Shiva NetManager software that lets the NetWare administrator configure and monitor multiple LANRover/T servers over the network or from a remote location.

LANRover/T for NetWare will be available next month at $2,799 for the four-port version and $3,899 for the eight-port version.

Shiva: (617) 270-8300. ☑

Two approaches to running Windows applications under Unix

	Sun Microsystems, Inc.'s WABI	Microsoft Corp.'s licensing of Windows source code
Speed	As fast as Windows	Slower than Windows
Compatibility	13 applications certified, many more possible	All Windows applications
Technology	Translation	Emulation
Supported by	BitStream, Inc., Borland International, Inc., Corel Systems Corp., IBM, ICL, Inc., Lotus Development Corp., Network Computing Devices, Inc., Quarterdeck Office Systems, Inc., Sun, The Santa Cruz Operation, Inc., Toshiba Corp., Unix System Laboratories, Inc., WordPerfect Corp. and others	Microsoft, Insignia Solutions, Inc.
User Cost	Free	Pricing not set yet
Availability	90 days	6 to 12 months

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: *NETWORK WORLD*

Vendors port Windows, Mac apps to Unix platforms

Signals stronger competition for Unix software.

By Fredric Paul
Senior Editor

SAN JOSE, Calif. — Network managers who want to run popular Macintosh and Windows applications on their Unix servers and workstations may find their job a bit easier by the end of the year.

New technology introduced last week by Apple Computer, Inc. at its Worldwide Developers Conference will let Macintosh programs run on a wide variety of Unix platforms and take advantage of Unix's built-in networking. Apple's announcement comes on the heels of similar technologies from Microsoft Corp. and Sun Microsystems, Inc. designed to run Windows applications under Unix.

The three announcements add up to a shot in the arm for Unix vendors, which now have an answer to Windows NT's integration with Windows 3.1. According to Scott McNealy, Sun chairman and chief executive officer, access to Windows applications is NT's only advantage over Unix.

Morris Taradalsky, vice president of Apple's Enterprise Systems Division, said the company is working with Hewlett-Packard Co., IBM, Sun and Unix System Laboratories, Inc. (USL) to make Macintosh software services and Macintosh applications available on Unix clients and servers.

By later this year, Taradalsky said, Macintosh applications will be able to run unmodified on IBM RISC System/6000, HP Apollo 9000 Series 700 and Sun SPARCstation platforms. The Macintosh applications will be able to run in a Macintosh window on the Unix platform and can share data with and take advantage of all Unix services.

The move broadens the market for Macintosh software developers and plays into Apple's strategy of de-emphasizing the hardware part of its business in favor of promoting its signature system software.

On the Windows front, Microsoft will let third parties license its Windows source code and application program interface (API) to develop Unix-based Windows applications. But because it requires hefty license fees and employs emulation technology, Microsoft's solution is likely to be expensive and slow.

Sun's new Windows Application Binary Interface (WABI) translation technology, meanwhile, is expected to run Windows applications faster and at a lower cost. Unfortunately, the initial release of WABI, due out in 90 days, will certify compatibility with just 13 of the most popular Windows applications.

A closer look at the competing technologies explains what each approach offers net managers (see graphic, this page). WABI was developed by Sun's SunSelect business unit and USL with technology acquired from Praxsys Technologies, Inc., in Norwood, Mass. It translates Windows function calls into a form recognizable by Unix's X Window System.

Previewed with the introduc-

(continued on page 16)

SCO divides server, desktop products

Vendor to cluster products from those groups under separate lines; announces new Unix wares.

By Fredric Paul
Senior Editor

SANTA CRUZ, Calif. — The Santa Cruz Operation, Inc. (SCO) this week intends to announce new and enhanced client and server Unix offerings, along with a general restructuring of its product line.

The restructuring of SCO's desktop and server product lines is intended to more closely reflect the way users buy network and desktop operating systems. The firm, which makes Unix software for Intel Corp.-based computers, will separate its products into core operating system products under its SCO Open Server family and desktop products under the SCO Open Desktop line.

SCO Open Server includes server products from the company's old Open Desktop line, as well as multiuser and network connectivity enhancements from the old SCO Unix line.

SCO Open Server Release 3.0 includes the SCO Open Server Network System, which adds integrated Transmission Control Protocol/Internet Protocol and NetWare Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) protocol support, plus increased network capacity — a maximum of 1,024 open sockets, or node connections. Other enhancements include the extension of the Transport Layer Interface to support Network Basic I/O access, plus greater system capacity, with support for as many as 11,000 concurrently opened files.

The SCO Open Server Enterprise System adds enhanced graphics with support for The Open Software Foundation, Inc.'s Motif 1.2 shared libraries and more graphical support and administrative functions.

The revamped Open Desktop line now includes all the firm's client-based products. The new SCO Open Desktop Lite, a stripped-down version of Open

(continued on page 16)

Powerful Pentium servers coming to light at last

By Caryn Gillooly
Senior Editor

SANTA CLARA, Calif. — Details of powerful new servers from vendors such as Compaq, Dell, HP and Unisys will flood the news wires this week in conjunction with the long-awaited release of Intel Corp.'s new Pentium microprocessor.

Compaq Computer Corp., Dell Computer Corp. and Hewlett-Packard Co. had been expected to announce new Pentium products or strategies (*NW,* May 10, page 6). But new to the fray will be Unisys Corp., which is also expected to announce its plans for releasing Pentium-based servers and personal computers.

Unisys will announce new PW2 Advantage Plus 5606 and 5608 PCs and U 6000 Unix departmental servers as its first Pentium processor-based offerings. Further down the road, the Blue Bell, Pa.-based company plans to add Pentium-based CTOS workstations and servers.

The entry-level U 6000/100 and mid-range U 6000/300 will be single-processor servers. The 6000/300 will use a 60-MHz Pentium processor, while the 6000/100 will ship with an Intel i486DX2, although it will be field-upgradable to accommodate a Pentium processor.

The two models are expected to be eight-slot Extended Industry Standard Architecture (EISA) systems supporting up to 192M bytes of memory and 2.1G bytes of disk space. Both will be available in the third quarter, although pricing was unavailable.

Unisys also will announce plans to offer a multiprocessor Unix server, designed specifically for the Pentium and future Intel processors, such as the P6. They

(continued on page 16)

SunWorld hosts SMCC's SPARCserver 1000 debut

Vendor also announces Banyan partnership.

By Fredric Paul
Senior Editor

SAN FRANCISCO — Sun Microsystems Computer Corp. (SMCC) used last week's SunWorld show here to introduce its new SPARCserver 1000 and announce that it is working with Banyan Systems, Inc. to integrate VINES into Sun Microsystems, Inc.'s Solaris operating system running on SPARC computers.

Sun, in Mountain View, Calif., revealed some details about the Spring Project, its effort to develop a new network-capable operating system.

The debut of SMCC's SPARCserver 1000, which was expected (*NW,* May 10, page 6), fills the last hole in Sun's rightsizing strategy, said Scott McNealy, Sun chairman and chief executive officer. The SPARCserver 1000 is designed to work in departments with 50 to 500 users running applications that serve the financial, retailing, manufacturing, telecommunications and transportation industries, the company said.

The SPARCserver 1000, about the size of a laser printer, is basically a smaller version of the high-end 20-processor SPARCserver 2000. Bundled with SunSoft, Inc.'s Solaris 2.2 Unix-based operating system, the SPARCserver 1000 holds between one and eight 50-MHz scalable processor architecture processors, from 32M to 2G bytes of random-access memory, and up to 8.5G bytes of internal and 100G bytes of external storage. It supports up to a dozen SBus expansion slots and four I/O channels.

Upgrades of new processors, memory and storage are based on plug-and-play modules for easy installation. Performance is scalable from 135 to 1,000 million instructions per second, said Anil Gadre, vice president of product marketing at SMCC. With a single processor, the performance of the SPARCserver 1000 is competitive with other servers in its class, Gadre said, while adding more processors clearly makes it the speed winner.

Available in quantity this quarter, the SPARCserver 1000 will cost between $36,700 for a version with a single CPU, 32M bytes of RAM and 1G byte of disk space to more than $130,000 for a fully loaded eight-chip system. Sun also announced an upgrade to SMCC's SPARCserver 2000 that has 50-MHz processors and a 2M-byte external cache designed to boost performance by 30%. The SPARCserver 1000 and 2000 carry one-year on-site warranties.

> SPARCserver 1000 fills the last hole in Sun's rightsizing strategy, McNealy said.
>
> ▲▲▲

The agreement between Sun and Banyan, which was also expected, calls for the two companies to work together to integrate Banyan's VINES network services with SunSoft's Solaris operating system.

David Mahoney, Banyan's chairman and CEO, said his company plans to take VINES' directory and its directory administration, management, security and messaging features and port them to the Solaris environment. Merging VINES' management tools with SunNet Manager will let network administrators use a single console to manage the logical infrastructure represented by the VINES services.

VINES on Solaris will be aimed at midsize to large businesses — a group with a unique set of needs, according to Mahoney. These companies work in a multivendor environment, he said, where no one vendor can solve everything.

"Everywhere we go, there are PCs and workstations," McNealy said. Integrating VINES and Solaris, he said, "will bring those worlds together." McNealy also pitched the SPARCserver 1000 as "an outstanding VINES server."

Art Beckman, manager of client support services at Pacific Gas & Electric Co. here, said Sun had done a good job of helping users migrate databases off the mainframe. He added that the deal with Banyan would help extend that information all the way to the desktop. Users will never have to see the "basically ugly" mainframe and minicomputer environments, he said.

Products based on the agreement are due in the first half of next year.

Finally, in a long-term response to Microsoft Corp.'s plans for Cairo, a new generation of operating systems based on Windows NT (*NW,* March 22, page 13), Sun revealed details of the Spring Project, its own vision of a high-quality next-generation operating system.

According to Wayne Rosing, president of Sun Microsystems Labs, the Spring Project architecture consists of a simple microkernel, a set of base-system services and a group of extensions for such functions as networking, file service and Unix emulation.

Spring is a technology, Rosing said, not an operating system, and could be used as a basis for many different operating systems. Spring, which is not inherently Unix, could run Unix as an object, but could also run other operating systems.

Spring will be fully documented and freely usable with no strings attached, Rosing said. Although specific products are reportedly at least a year away, Rosing said implementations of Spring in source code would be available from Sun to all comers.

Sun: (415) 960-1300.

Pentium servers coming to light

continued from page 15

will be available by year end.

Also this week, Dell will announce the new 4560/XE server based on the 60-MHz Pentium processor. Starting at a base price of $5,550, the 4560/XE will provide eight 32-bit EISA expansion slots, up to 128M bytes of memory and up to 57G bytes of storage, using Dell's External Media Storage System.

In addition, Dell will introduce a 60-MHz Pentium upgrade card for its existing PowerLine 486/SE servers. The cards will be available this week for $2,499.

Compaq this week will bring out Pentium-based versions of its ProSignia and SystemPro/XL server lines. The Pentium-based ProSignia 5/60 and SystemPro/XL 5/66 server lines will be available by the end of the third quarter for $6,299 and $17,999, respectively.

Finally, the new HP NetServer LM series servers will be multiprocessing machines based on the 60-MHz Pentium microprocessor. The machines will offer hot-pluggable drives, error correction code memory and up to 384M bytes of random-access memory with expansion boards. The servers will be available next month and will range in price from $3,799 to $12,549, depending on configuration.

Compaq: (800) 345-1518; Dell: (800) 289-3355; HP: (800) 752-0900; Unisys: (800) 448-1424.

Vendors port apps to Unix

continued from page 15

tion of Sun's Solaris 2.0 environment last month (*NW,* April 5, page 13), WABI is the first product written to a draft specification called the Public Windows Interface (PWI). "We documented the Windows API for Microsoft, published it and then gave it to X/Open [Company, Ltd. for certification]," McNealy said. PWI is a standard interface for software vendors that want to make sure their products work on both Windows and Unix platforms.

As the first implementation of PWI, WABI's tight integration with Unix gives Windows applications access to all Unix functionality. The first release of WABI will support Microsoft's Dynamic Data Exchange and Object Linking and Embedding (OLE) but not necessarily the new OLE 2.0. Support for the WINsockets interface, Integrated Packet Exchange (IPX) and Network Basic I/O System will be included in a December release, said Andy Halford, director of engineering at SunSelect.

Sun says WABI does not use Windows code. Without the expense of paying royalties to Microsoft, many Unix operating systems, including Solaris, plan to include WABI for free.

The big problem is Windows compatibility. SunSelect and USL plan to certify new applications and offer a self-certification kit for software developers. But Sun acknowledges that programs that make use of undocumented Windows function calls may never operate under WABI.

For its part, Microsoft will license its Windows source code, user interface, APIs and trademark to selected companies that want to build solutions that would let Windows run on Unix platforms. Microsoft struck its first such deal with Insignia Solutions, Inc. of Mountain View, Calif., which already makes a Unix-based Windows emulation product called SoftPC.

Frank Cohen, Insignia's director of marketing, acknowledged that WABI will be "a little bit faster" than SoftPC, but said the agreement would lead to a faster version by the end of the year. Licensing the code from Microsoft is expensive, however, and SoftPC currently lists for $549.

Insignia: (415) 694-7600; Microsoft: (206) 882-8080; SunSelect: (508) 442-0000; Apple: (408) 996-1010.

SCO divides server, desktop

continued from page 15

Desktop, was designed for companies using Open Desktop as a front end in pure Unix TCP/IP environments.

According to Brian Wadsworth, marketing manager for SCO's product group, these customers do not need the regular version's support for multiple nets and Windows applications.

Also, SCO enhanced many of its networking extension products. SCO TCP/IP Release 1.2.1 now supports up to 1,024 open socket connections; includes a Transport Layer Interface NETBIOS module; updates its Simple Network Management Protocol network management system with SNMP multiplexing, an interface for passing management information to SNMP agents across the network; and improves its Point-to-Point Protocol support for dial-up connections.

In addition, SCO NFS Release 1.2.1 supports a maximum of 11,000 open files.

All of the new products will ship late this month or in early June, Wadsworth said. Client prices range from $695 for SCO Open Desktop Lite Release 3.0 to $1,195 for SCO Open Desktop Release 3.0. On the server side, SCO Open Server Network System Release 3.0 costs $1,895 for a 16-user license and $2,495 for a 512-user license. The SCO Open Server Enterprise System Release 3.0 lists for $2,195 for a 16-user license and $3,195 for a 512-user license.

The replacement of the existing SCO Unix and SCO Open Desktop families was designed to make the company's product line easier to understand, Wadsworth said. SCO Unix had included a base operating system with optional enhancements, while the integrated Open Desktop family, designed for client/server computing, included both desktop and server products.

The restructuring puts all server software in one product line and desktop products in another.

With a $72 million to $84 million initial public offering pending, SCO also wanted to counter the widespread perception that it is aiming at low-end work group environments. "The reality is we've got the performance," thanks to high-speed 486 and Pentium chips as well as multiprocessor server designs, Wadsworth said.

SCO had to do something to respond to the challenges of UnixWare price cuts, Sun Microsystems, Inc.'s new Solaris for the x86 operating system, and the imminent release of Microsoft Corp.'s Windows NT, said Paul Cubbage, a principal analyst at Dataquest, Inc. in San Jose, Calif

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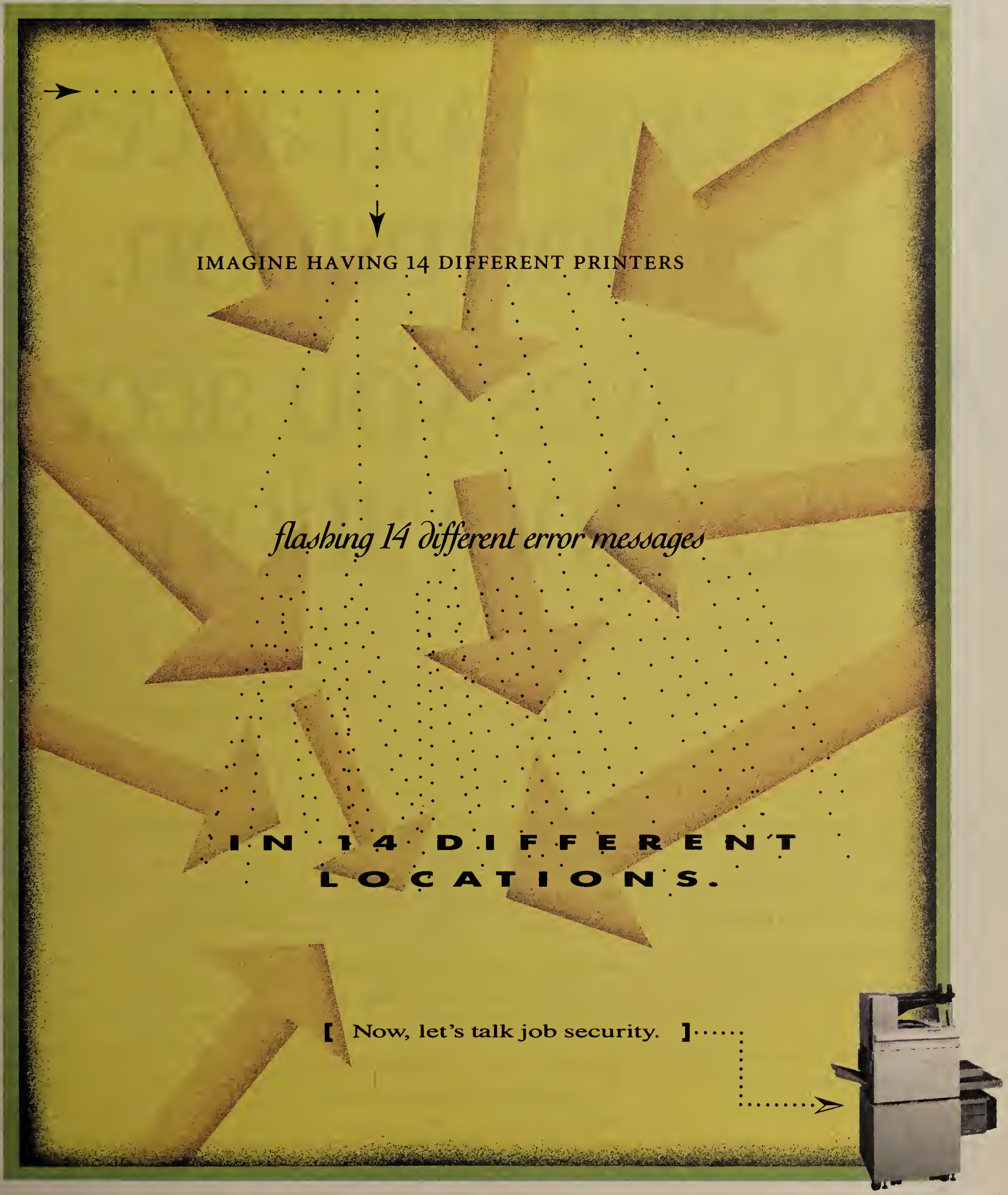
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LAN-TO-LAN AND LAN-TO-WAN EQUIPMENT AND STRATEGIES

Worth Noting

"In order to reach the next level, bridge/routers have to move from being traffic-passing boxes to traffic-managing boxes."

Sam Shuler
Communications strategy manager
Texas Instruments, Inc.
Plano, Texas

Link Notes

Ungermann-Bass, Inc. has rolled out an eight-port version of its DragonSwitch Ethernet switching module for its Access/One intelligent hub line, complementing the 16-port model that was previously available. The new module, which will be upgradable to the higher density version, will be available later this quarter. Pricing will begin at $900 per port.

UB also announced two new network interface cards. The UB-UTPTRA, for 8- and 16-bit Industry Standard Architecture (ISA) buses and 32-bit Extended ISA buses, provides support for both 4M and 16M bit/sec unshielded or shielded twisted-pair token-ring nets. The card also supports Novell, Inc. NetWare 2.X and 3.X, as well as the Microsoft Corp. Network Driver Interface Specification (NDIS), Open Data Link Interface and Transmission Control Protocol/Internet Protocol drivers. Available now, the UB-UTPTRA costs $615, or $2,800 in a bundle of five.

The UB-UTP16B is a 16-bit 10Base-T adapter designed to provide unshielded twisted-pair connections for file servers and high-performance workstations on the local-area network or enterprisewide nets.

The card will support a va-

(continued on page 20)

Vendor service and support alliance gets its wings

Will assist users in managing multivendor nets.

By Skip MacAskill
Senior Writer

BOSTON — In response to user demands for better service and support, a group of leading network vendors officially launched the Networking Technical Support Alliance (NTSA) last week at the Service Support Expo here.

The NTSA will attempt to set standards of service and support in multivendor network environments that will result in more reliable networks and minimize finger pointing by vendors when problems arise.

The idea, which is based on the Technical Service Alliance initiated by Novell, Inc. in 1991, was originally proposed by 3Com Corp. and six other charter members — Hewlett-Packard Co., IBM, Proteon, Inc., SynOptics Communications, Inc., Ungermann-Bass, Inc. and Wellfleet Communications, Inc. — last February (*NW*, Feb. 1, page 19).

According to Ron Sege, vice president of customer service for 3Com and spokesman for the NTSA, since products from multiple vendors are often required to meet user needs, the NTSA will develop guidelines that will ease the implementation and management of these devices in the multivendor net.

The alliance is tapping into a critical area for users. In a recent survey conducted by Dataquest, Inc., users cited service and support as the most important criteria when selecting vendors. The survey also shows that users' biggest concern is how to resolve network problems when products from several vendors are involved.

(continued on page 20)

Penril inks Datability acquisition

By Maureen Molloy
Senior Editor

GAITHERSBURG, Md. — Penril DataComm Networks, Inc. is angling to make bigger strides in the internetworking arena with the purchase of bridge/router vendor Datability, Inc.

Penril last week announced it has acquired Datability in a tax-free reorganization involving about $1 million in Penril shares as well as the assumption of some Datability debts. Carlstadt, N.J.-based Datability has annual sales of about $22 million. Penril's annual sales last year topped $46 million.

While Penril currently manufactures a Fiber Distributed Data Interface bridge as well as a mid-range, multiprotocol Ethernet bridge/router, the company is best known for its modems and T-1 multiplexers.

Division President David Johnson said the Datability merger will enable Penril to focus on two key markets. "Our objective is to continue our focus on the wide-area network. But, through the [Datability] acquisition, we can propel ourselves further into the LAN internetworking area and merge the two product areas," he said.

Datability products include terminal servers, personal computer-to-host gateways, the DXA-550 multiprotocol router and the Mux/Router, a combination statistical multiplexer and Ethernet router.

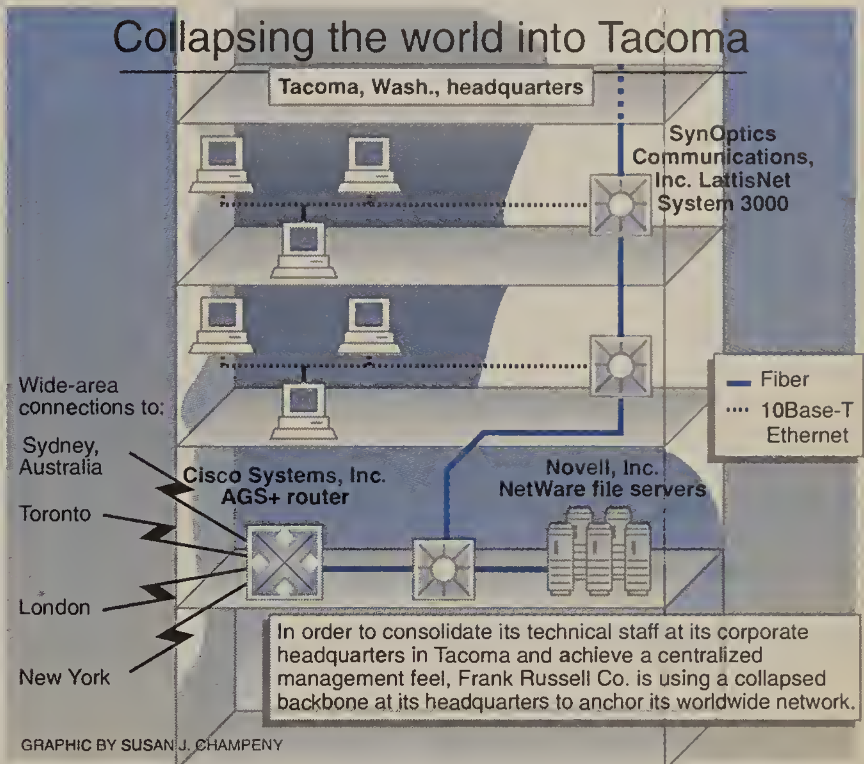
In an agreement last month, Datability licensed all internetworking technology from Clearpoint Research Corp., which closed its doors earlier this year. Datability also hired Clearpoint's core engineering team to continue development work Clearpoint had under way before its demise.

That has enabled the company to expand its product line to include Clearpoint's Reduced Instruction Set Computing series of multiprotocol bridge/routers.

The resulting product line, which will be brought under a common Penril product name, will provide a family of internetworking products that includes small remote bridges and mid-range multiprotocol routers, Johnson said. The Datability merger will also enable Penril to expand its OEM and product distribution channels, he added.

Penril: (301) 417-0552. ◻

Collapsing the world into Tacoma


Tacoma, Wash., headquarters
SynOptics Communications, Inc. LattisNet System 3000
Fiber
10Base-T Ethernet
Wide-area connections to:
Sydney, Australia
Toronto
London
New York
Cisco Systems, Inc. AGS+ router
Novell, Inc. NetWare file servers

In order to consolidate its technical staff at its corporate headquarters in Tacoma and achieve a centralized management feel, Frank Russell Co. is using a collapsed backbone at its headquarters to anchor its worldwide network.

GRAPHIC BY SUSAN J. CHAMPENY

Financier puts stock in hub-based internet

Firm turns to SynOptics to anchor client/server environment for intelligence, power at desktop.

By Skip MacAskill
Senior Writer

TACOMA, Wash. — When you are handling pension fund investments of companies such as AT&T, Exxon Corp., General Electric Co. and IBM, the ability to access timely stock and securities information is paramount to your success.

In light of that, the network administrators at Frank Russell Co. stepped back and took stock of their worldwide network three years ago, making a decision to augment its proprietary systems and dumb terminals with a new client/server net so they could better serve its clients.

According to Bill Branson, a senior network engineer at the financial firm, the goal of the project — which is nearing completion — was to provide more power, flexibility and intelligence at the desktop.

"What really drove us to an internetwork environment was our desire to go to a client/server architecture so we could have intelligent PCs on the desktop," he said. "We do an awful lot of graphics and computational tasks and decided those applications would be better suited on the PC instead of loading down that processing on our minicomputers and mainframe."

Frank Russell's old environment included several hundred personal computers outfitted with Wang Local Office Connection cards that were hard-wired to a Wang Laboratories, Inc. VS minicomputer. There were also a number of PCs equipped with Digital Communications Associates, Inc. IRMA terminal emulation cards that were linked to an IBM ES9000 mainframe through a channel-attached cluster controller. Some PCs were connected to both systems.

The company also had a few scattered local-area networks based on SynOptics Communications, Inc.'s older 1000 series hubs.

The current client/server goal grew out of a basic plan to migrate some business applications, such as spreadsheets, word processing and document image management, from the Wang VS to a Microsoft Corp. SQL Server running on an OS/2 PC-based platform in order to provide easier and quicker access to those applications.

In its examination of ways to improve delivery of client services, Frank Russell also decided to reevaluate its LAN infrastructure, giving rise to the idea of designing a client/server net.

A core piece of the architecture the company developed to support the move to client/server was the adoption of a col-

(continued on page 20)

Financier puts stock in hub-based internet

continued from page 19

lapsed backbone based on modular hubs that provided network management and support for various technologies. After evaluating available products, Frank Russell decided to standardize on SynOptics LattisNet System 3000 intelligent hub.

"We decided on SynOptics 3000 because of the flexibility it gave us in terms of token-ring and Ethernet connectivity, and it also had the best network management at the time," Branson said.

The first phase of the project included installing one 3000 on each of two upper floors in the company's 12-story headquarters here. Each hub supported a 10Base-T Ethernet LAN with between 15 and 25 PCs.

The hubs were linked via a vertical fiber-optic connection to another 3000 in the computer room on the second floor that provided links to four Novell, Inc. NetWare file servers, the SQL server and two IBM RISC System/6000s.

> "We want our highly technical people here in Tacoma and not spread around the world," Branson said.
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The hub also supported a Cisco Systems, Inc. AGS+ router that was used to route traffic between the various LAN segments supported by the 3000s, as well as provide wide-area network connections to company offices worldwide, including those in London, Toronto, New York and Sydney, Australia.

LANs were eventually introduced onto each floor, and the immediate benefit was a management one, in terms of getting better control of the net, Branson said.

"The initial payoff was much better management," he said. "Everything came to a central location, and it really complemented our building's physical structure. We had the fiber running vertically and 10Base-T out to the desktop from the riser. It made for a nice concise wiring plan."

The company uses SynOptics' LattisNet Manager for Unix net management system to manage the new network. "The LattisNet application allowed us to look at traffic on a per-port basis, assess applications in the development process and get a real feel for how much bandwidth each application was eating up," Branson said. "We were able to track a variety of statistics, including error rates, network performance and utilization."

The second phase of the project included introducing LANs at remote locations and providing wide-area connections in the corporate network here. "We've configured the remote offices from a management point, as well, so they essentially appear as just another floor location," Branson said.

While the Wang minicomputers and IBM host will continue to be employed at corporate headquarters, the plan is to eventually phase them out at the international sites, using PC gateways to access the SQL server here.

Each remote office has a Novell file server as well as a 3000 hub with a net management module and an integrated router module based on Cisco's IGS model that allows the location to access Frank Russell's X.25 network provided by BT.

The London, New York and Sydney offices have already been outfitted with the above equipment and tied to the backbone. The Toronto location is expected to be completed soon.

Branson is also able to dial into the asynchronous port of the remote devices via a packet assembler/disassembler on the WAN, allowing him to configure a router in Sydney, for example, from his office here. "We've been able to save a lot of time and money as a result of that capability," he said.

The third phase of the project includes integrating SynOptics Network Control Engine (NCE) functionality into the network, which will allow Frank Russell to receive alarms and alerts from across the net without flooding the traffic paths with constant Simple Network Management Protocol polls. Used in conjunction with protocol analysis software, the NCE — which is a Sun Microsystems, Inc. SPARCstation II on a card — enables Branson to troubleshoot problems remotely.

"If someone in Sydney is complaining about a printer that is constantly hanging, I can do protocol analysis from here in Tacoma, determine that the Windows driver needs to be fixed and handle the problem," he said.

That type of capability reflects how Frank Russell views the network as a tool that helps it meet business goals. In the company's vision, the headquarters is seen as the brain trust of the organization.

"We want our highly technical people here in Tacoma and not spread around the world," Branson said. "Management, therefore, was a key benefit for us in that we didn't need extremely technical people at every site we maintain."

Vendor alliance gets its wings

continued from page 19

To make sure users get timely and efficient responses to their multivendor problems, the NTSA will initiate the Multivendor Problem Resolution Process, which is designed to lay the groundwork for better cooperation among vendors when working together to remedy network ills.

> The Multivendor Problem Resolution Process is designed to lay the groundwork for better cooperation.
>
> ▲▲▲

The NTSA announced that it will be comprised of four sections: a Management Committee, a number of standing committees, a Customer Advisory Board and Members at Large.

Vendors that joined the seven charter members in making the announcement last week included Advanced Computer Communications, Chipcom Corp., Cisco Systems, Inc., Eicon Technology Corp., General DataComm, Inc., Hughes LAN Systems, Inc., Hughes Network Systems, Madge Networks, Inc., Newbridge Networks Corp. and Olicom USA, Inc.

Participation in the NTSA is voluntary and open to companies that design, manufacture, sell and support generally available products that fall into Layer 3 of the Open Systems Interconnection model.

NTSA: Ron Sege at (408) 764-7217 or Peter Filice of Hughes LAN at (415) 966-7445.

Link Notes

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riety of drivers, including OS/2, DOS, NDIS and NetWare 2.2. Available now, the UB-UTP16B costs $189, $895 for a five-pack bundle and $3,380 for a bundle of 20.

UB: (800) 777-4526.

Cameo Communications, Inc. next month will roll out the UltraHub 3000, an Ethernet-to-Fiber Distributed Data Interface bridge that gives its UltraHub 5000 Intelligent Concentrator and UltraHub 1000 Workgroup Hub users access to FDDI backbones. The bridge, which comes in multimode fiber, single-mode fiber and twisted-pair versions, can filter data at 500,000 packet/sec and forward at the Ethernet theoretical maximum of 14,880 packet/sec. Available next month, the 3000 costs $8,995.

Cameo: (800) 438-4827.

Network Systems Corp. (NSC) has reduced the prices of its 6600 single-board family of routers by almost 40%. Effective immediately, pricing on the 6600 router now ranges from $4,995 to $17,000. The company also announced that it will acquire interconnect controller vendor Bus-Tech, Inc. for $24.5 million. Bus-Tech will still be an independent business unit, with NSC reselling Bus-Tech products.

NSC: (612) 424-4888.

Fibermux Corp. has rolled out two new SmartBridge Ethernet local bridge modules for its Crossbow intelligent hub that can bridge traffic between any two of the hub's four Ethernet backplanes. The modules, which each can forward 13,000 packet/sec, include the CC6672ZZ and the CC6673ZZ. The 6672 has two attachment unit interface (AUI) connections. Available now, it costs $3,495. The 6673 has one AUI connection and two Fiber Optic Inter-Repeater Link ports. It is also available now and costs $3,895.

Fibermux: (818) 709-6000.

3Com Corp. and **TRW, Inc.** have announced a cooperative sales and marketing agreement to provide global networking services for large commercial and government users. The deal will involve the development of new products that integrate TRW's Asynchronous Transfer Mode wide-area network technology with 3Com's line of adapters, hubs and bridge/routers.

Neither specific time frames nor product development plans were announced.

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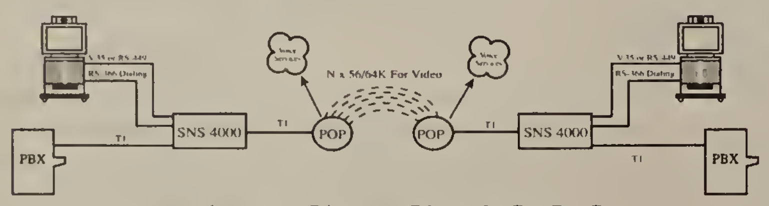

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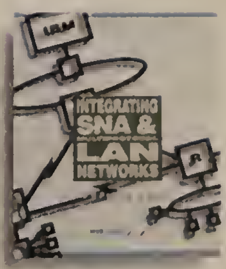

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DOMESTIC AND INTERNATIONAL VOICE/DATA SERVICES, ACCESS EQUIPMENT AND REGULATORY ISSUES

Worth Noting

The number of ISDN tariffs filed by 11 local exchange carriers will soar from 36 in 1992 to 166 by year end, according to a recent report by Information Gatekeepers, Inc., a research firm in Boston.

Carrier Watch

MCI Communications Corp. has signed agreements valued at a total of $19.6 million to provide network services to two users, First Financial Management Corp. (FFMC) and The Guardian Life Insurance Co. of America.

FFMC, an Atlanta-based information services provider, signed a three-year, $12.6 million agreement with MCI to use the carrier's Virtual Network (Vnet) virtual voice net service, 800 service and Digital Data Services.

Under the terms of MCI's three-year, $7 million agreement with Guardian Life, MCI will become the company's primary long-distance service provider. The firm will use MCI's Vnet, Digital Data Service and 800 service, in addition to its Vnet Calling Card offering.

Both users will move some of their 800 traffic from other unnamed interexchange carriers to MCI.

MCI: (202) 872-1600.

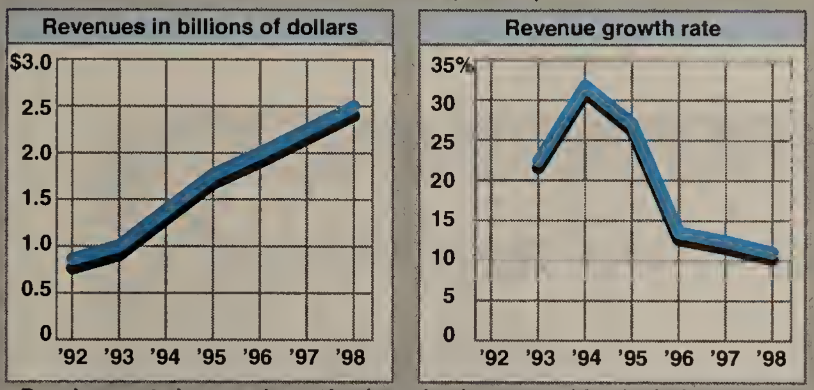
OTC, Ltd. this week will announce a series of private-line services between the U.S. and Australia, Hong Kong and Japan that range in speed from 64K to 2.048M bit/sec.

According to Frank Blount, chief executive officer at OTC, the carrier will announce a wide array of service-level agreements for multinational companies that use its Light-

(continued on page 24)

Voice processing market shows explosive near-term growth

Includes sales of voice synthesis, voice recognition and interactive voice response products.



Developments in speech synthesis and voice recognition include faster response times, higher accuracy and larger vocabularies. Interactive voice response vendors are building systems with far more ports.

SOURCE: FROST & SULLIVAN MARKET INTELLIGENCE, MOUNTAIN VIEW, CALIF.

GRAPHIC BY SUSAN J. CHAMPENY

Users never have to miss a call with Motorola system

Site Call enhances voice mail with paging option.

By Ellen Messmer
Senior Correspondent

BOYNTON BEACH, Fla. — Motorola, Inc.'s Customer Owned Paging Operation this summer will ship a paging system that alerts users of incoming phone calls while they move about their business locale.

Motorola's Site Call paging system, which is aimed at eliminating telephone tag caused by voice mail, transmits notification of incoming calls immediately to users' pagers when they are away from their desks.

Site Call, a personal computer-based system that connects to a user's private branch exchange or Centrex service, one-ups the typical voice mail system. When the called party does not answer the phone, Site Call gives the caller the option of waiting until the person is paged, rather than dumping the caller into voice mail.

Motorola's radio frequency-based paging system then transmits information about the incoming call to a Motorola alphanumeric pager, letting the user know the caller's telephone number or even the caller's name, if the company includes that information in its Site Call database.

With the information the pager receives, the user can then decide whether to take the call at the nearest available telephone or have the call transferred to either the Site Call voice mail system or the company voice mail system.

Motorola developed the on-site paging system to provide a way for users to avoid missing important calls at crucial times, such as deadlines and major sales decisions, even though they may temporarily be away from their desks.

"Voice mail doesn't always solve the problem," said Craig Wallace, third-party development manager at Motorola. "It gets the information across, but, often times, when you have deadlines to meet, it's not enough."

More to come

Site Call, the first in a new line of alert-notification products marketed under the name Site Connect, will cost about $500 per user for a complete on-site paging system for 500 users.

Motorola plans to release other alert-notification products under the Site Connect product line based on the same paging system as Site Call. These products will alert users of electronic mail, facsimiles and calendar updates stored in their PCs, as well as monitor security devices or malfunctions in manufacturing operations.

Motorola — which wants input from users about applications where paging notification would be beneficial — is now solidifying support from third-party software developers by licensing its Site Connect application program interfaces.

Motorola: (407) 364-3642.

AT&T tightens grip on PBX toll fraud

Carrier wages war on hackers with new password policies and switch software for its Definity G3s.

By Bob Wallace
Senior Editor

BEDMINSTER, N.J. — AT&T last week provided details on new software for its Definity Generic 3 (G3) private branch exchange and a new password policy that are designed to help users combat the growing toll fraud problem.

The features come standard in Version 2 of the switch software, which will be available in June for AT&T's full line of Definity Generic 3 PBXs, ranging from the low-end 20-40-line Definity G3VS to the high-end 10,000-line Definity G3r.

The new features include mandatory creation of system passwords, support for separate internal and external call forwarding, and a feature that lets operators check a call's origin before switching it to an outside trunk.

"We're working with our customers to come up with ways to thwart hackers," said Woody Ritchey, division manager of product marketing for AT&T's Global Business Communications Systems. "But given the persistence of hackers, the most secure PBX is one without phones."

The new features complement a Definity G3 feature announced last year that keeps hackers from using the Definity G3's direct-inward system access (DISA) port to place unauthorized calls and the PBX's administrative port to take over the switch (*NW,* Feb. 24, 1992, page 11).

No preset passwords

Under its new policy, AT&T ships Definity G3 switches without default passwords. The default passwords are the same for

(continued on page 24)

Start-up to support call center apps for businesses

By Bob Wallace
Senior Editor

ATLANTA — A group of Georgia investors last week announced the formation of InterServ Services Corp., a company that will provide 800-number response services to small and mid-size businesses that cannot afford dedicated call centers.

InterServ, based here, will offer support for customer service, a consumer information hot line, help desk, catalog ordering and dealer locator applications.

Regi Campbell, president and chief executive officer of the company, said many firms use 800 numbers to improve customer service but have not invested in the necessary computer systems and databases.

InterServ will target companies that receive at least 150 calls a day on their toll-free numbers. The firm will manage an entire customer response operation from live operators to data gathering and information management.

The new company plans to cash in on telemarketing services. Strategic Telemedia, a New York research and consulting firm, estimated that the market for such services will reach $2 billion this year, with a 12% annual growth rate.

InterServ will compete, to some extent, with 800 service bureaus, such as American Airlines, Inc.'s direct marketing subsidiary, AT&T's American Transtech unit and Matrixx Marketing, Inc.

InterServ will begin operating with 28 employees here and in sales offices in Dallas and Chicago. The firm plans to employ more than 500 people within five years, Campbell said.

The investor group that formed InterServ includes ITC Holding Company of West Point, Ga., which has backed firms such as Async Corp., a voice mail service bureau, and Telecom*USA, Inc., a regional long-distance service provider. Telecom*USA has since been acquired by MCI Communications Corp.

AT&T tightens grip on PBX toll fraud

continued from page 23

each Definity G3 switch shipped, so many users had the same passwords because most firms neglected to change them, AT&T said.

"Default passwords are easy to remember, which, unfortunately, means they are easy for hackers to figure out," Ritchey said. "We want customers to set their own passwords."

Users are now required to set their own passwords before bringing a Definity G3 with Version 2 software on-line.

Among the new security features is one that enables users to separate internal and external call forwarding. This feature requires the user to set forwarding restrictions separately on a per-phone basis.

With Version 2, network managers can program all phones to transfer calls to other internal stations but regulate which stations can forward calls to an outside line. Users can also disable all call forwarding capabilities for certain stations.

With the next approach, users can have the DISA port on their switches disabled to eliminate the threat of hackers dialing an 800 number to reach the Definity G3's DISA port and gain access to outside trunks.

This approach can provide users with permanent protection from hacking on a DISA port. Users can obtain the feature by purchasing special software at an as yet undisclosed price from AT&T.

Another security feature represents AT&T's acknowledgment that there is much more to PBX security than passwords. Version 2 supports call vectoring — the ability to answer selected calls with recorded messages, tones or silence.

AT&T hopes this feature will confuse and frustrate hackers who use autodialing devices to break preset passwords.

With a feature called Three-Way Check on Class of Restriction, an operator is automatically provided with the trunk that the call came in on, the extension that is transferring the call and the line over which the call will go out. Previously, the operator was only presented with the extension that was transferring the call.

This feature is designed to help thwart hackers who call a company employee and ask to speak to a second person who does not exist. The hacker typically asks to be transferred to an operator, then pretends to be a company employee and requests an outside line. With the feature, the operator can tell if the call was initiated internally or externally.

> "Default passwords are easy to remember, which means they are easy for hackers to figure out," Ritchey said. "We want customers to set their own passwords."
>
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The final feature provides the net manager with an audio or visual alert when the Enhanced Call Transfer feature is turned off. It also logs each event.

Enhanced Call Transfer ensures that calls are transferred to extensions listed in the switch's database, not to outside lines, which hackers previously could access by dialing nine on the keypad.

The software that supports the new security feature will be generally available next month.

According to Ritchey, future releases of Definity G3 switch software will support multiple passwords and speech recognition technology as a way of making access to PBXs tougher.

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Carrier Watch

continued from page 23

stream or Seamless Skystream services.

Lightstream services are carried over the South Pacific Network, which is a 16,000-km submarine fiber cable system that links Australia to the U.S. and Asia. Seamless Skystream is OTC's family of satellite-based services.

Both service families offer speeds of 64K, 128K, 192K, 256K, 384K, 512K, 1.544M and 2.048M bit/sec. Lightstream services will range in price from $5,804 per month for a 64K bit/sec link to $62,238 for a 2.048M bit/sec circuit. Skystream services will range from $5,175 per month to $55,245 for the same speeds. Both services carry a onetime $1,748 installation charge.

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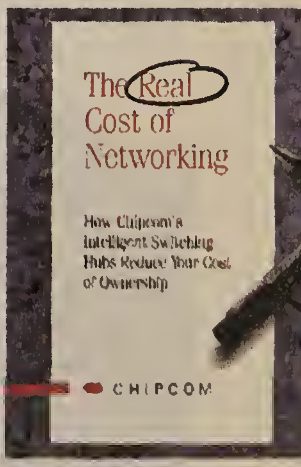
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Jeff Sturrock
Chairman
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Alexandria, Va.

Store & Forward

EcoSystems Software, Inc., a Cupertino, Calif., client/server management system vendor, last week announced EcoTools 2.0. The new version will run on Motif-based workstations, whereas the system previously used Sun Microsystems, Inc.'s OpenLook interface. EcoSystems has also added management support for Informix Software, Inc. and Sybase, Inc. databases. Other new features include a new graphical user interface and improved security. Most new features will be available in June, though the new database support will not be available until the fourth quarter. Pricing starts at $16,000.

EcoSystems: (408) 252-3801.

Da Vinci Systems Corp., a Raleigh, N.C., electronic mail software vendor, has licensed **Microsystems Software, Inc.**'s CaLANdar group scheduling product to remarket it under the name of Da Vinci CaLANdar. The DOS- and Microsoft Corp. Windows-based software is integrated with Da Vinci eMail and will begin shipping by June.

Da Vinci: (800) 328-4624 or (919) 881-4320.

Report finds Oracle's TPC results to be misleading

Says option discredits TPC-A as benchmark.

By Wayne Eckerson
Senior Editor

SOUTH YARMOUTH, Mass. — A research firm specializing in transaction processing issues recently charged that Oracle Corp. has undermined the credibility of the Transaction Processing Performance Council (TPC) and the database benchmarks the TPC oversees.

The Standish Group International, Inc., based here, has issued a report saying Oracle developed a special transaction option, called a discrete transaction, that was designed only for the purpose of elevating the results of the TPC's TPC-A database benchmark test.

"The discrete transaction option discredits TPC-A as a viable commercial systems benchmark," states the report, titled "Foul Flag Flies for Oracle 7, TPC," written by Standish Group Chairman Jim Johnson. "The discrete transaction is a ruse — a special option designed only to execute the TPC-A benchmark."

The report calls for the TPC to revamp the way it validates benchmark results by adopting a strict code of ethics and establishing a user review board, among other things.

Kim Shanley, administrator of the TPC in San Jose, Calif., said the organization, which comprises about 40 vendors, would not reconsider its decision to admit the results of Oracle's TPC-A benchmark with the discrete transaction. However, he said TPC's steering committee is reviewing its policies to ensure that the organization receives an appropriate level of industry and user input.

"Many members are tempted to develop 'benchmark specials,' " Shanley said. "Everyone wants to press the rules to the limit, and it's the council's job to scrutinize any attempt to do so."

Several database vendors protested Oracle's TPC-A benchmark results for Oracle 7, but they could not muster enough votes

(continued on page 28)

Object Design introduces NLM version of database

By Bob Brown
Senior Editor

BURLINGTON, Mass. — Object Design, Inc. last week said it has worked with Novell, Inc. to build a NetWare Loadable Module (NLM) version of its ObjectStore object database.

Object Design's new ObjectStore NLM Server is structured to simplify the building of distributed applications for Novell nets and to create applications that can access a variety of data types.

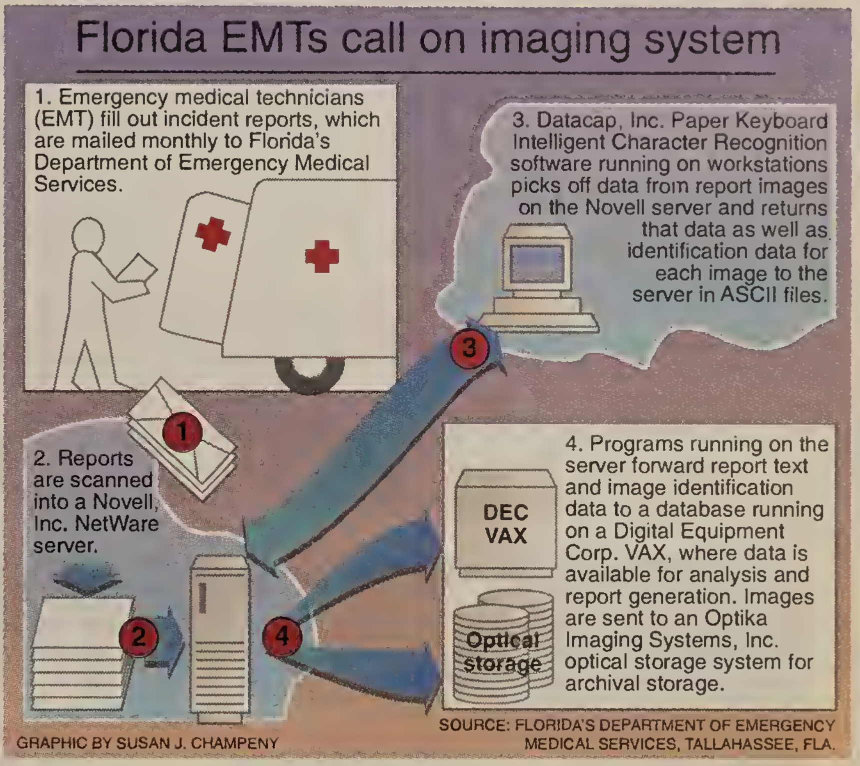
The development of the new NLM, which Novell funded, is in line with Novell's plans to enhance its product line with object-oriented technology. In February, Novell announced an agreement with HyperDesk Corp. to integrate HyperDesk's Distributed Object Management System with NetWare.

The ObjectStore NLM Server will run as a NetWare process, giving developers and users a common way to interface with both NetWare services and a variety of data types, including multimedia and imaging. Given that ObjectStore is a distributed database technology, it will support the development of groupware, work flow and other distributed applications across NetWare networks, said Ian Schmidt, director of desktop and network products at Object Design.

"Our most rapid growth is in the office automation area, where companies are replacing applications that were more file-based and single-user, and making them multiuser," Schmidt said. "The whole drive on the desktop for groupware is right in line with our technology."

The collaboration will enable developers to build object-oriented client/server applications for NetWare nets supporting clients running Windows 3.1, UnixWare, Solaris 2.X and other operating systems. Connectivity support in-

(continued on page 28)


Florida EMTs call on imaging system
1. Emergency medical technicians (EMT) fill out incident reports, which are mailed monthly to Florida's Department of Emergency Medical Services.
2. Reports are scanned into a Novell, Inc. NetWare server.
3. Datacap, Inc. Paper Keyboard Intelligent Character Recognition software running on workstations picks off data from report images on the Novell server and returns that data as well as identification data for each image to the server in ASCII files.
4. Programs running on the server forward report text and image identification data to a database running on a Digital Equipment Corp. VAX, where data is available for analysis and report generation. Images are sent to an Optika Imaging Systems, Inc. optical storage system for archival storage.
DEC VAX
Optical storage
1
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GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: FLORIDA'S DEPARTMENT OF EMERGENCY MEDICAL SERVICES, TALLAHASSEE, FLA.

Florida group puts imaging to the test

New system allows for more cost-effective and efficient filing and retrieving of incident reports.

By Bob Brown
Senior Editor

TALLAHASSEE, Fla. — Florida's Department of Emergency Medical Services is rolling out a new networked imaging application that is literally a matter of life and death.

The Florida organization recently wrapped up field trials of the imaging system at 11 of its 200 offices and found that the system allowed emergency medical technicians (EMT) to spend less time doing paperwork and more time helping people. The system also allowed for more efficient analysis of the services provided by EMTs, such as improving resource allocation, among other things.

Revamping Florida's EMT system began with the replacement of five reports previously filled out by EMTs for each incident with a single form. Like the old forms, the new ones are mailed to Florida's Department of Emergency Medical Services here for analysis monthly.

Unlike the old system, where the forms were entered into computers by data entry personnel, the new system scans documents with a Fujitsu America, Inc. scanner and sends the data over an Ethernet network to be stored as an image on a Novell, Inc. NetWare file server. About 10,000 forms can be scanned daily.

The new system will enable about 1.2 million forms to be processed a year, whereas the department has only been able to handle about 190,000 forms per year in the past, said Greg Mathes, a systems programmer at the department.

How it works

Once the images of the forms are on the NetWare server, they can be accessed by end users at networked workstations running Datacap, Inc.'s Paper Keyboard Intelligent Character Recognition (ICR) software. This software picks off data from the images — such as patient information — and sends that data in an ASCII file back to the server. This data is later sent to a Dataflex database from Data Access Corp.

If data cannot be deciphered by Paper Keyboard ICR, a picture of the data in question — such as an illegible handwritten response — is presented to the end user for verification. Meanwhile, the Paper Keyboard ICR software also sends to the server an ASCII transaction file that contains all of the information an imaging system on the network needs to automatically store the image.

The ASCII files are sent via DECnet to the Dataflex database, which resides on a Digital Equip-

(continued on page 28)

Report finds Oracle's results misleading

continued from page 27

within the TPC to challenge and overturn the results, Johnson said. Oracle's support within the TPC came from a number of hardware makers that participated in the benchmark tests and joined Oracle in announcing the Oracle 7 database last June.

The Oracle 7 discrete transaction bypasses many of the integrity features and general functionality of the Oracle 7 database management system in order to reduce the amount of processing needed to execute a transaction, according to Johnson. This lack of functionality means few users, if any, would ever implement the discrete transaction in a production environment, he said.

Johnson estimated that the discrete transaction reduces the number of instructions the database has to process by 50%, significantly improving its performance on benchmark tests relative to other relational DBMSs.

Walter Baker, manager of performance engineering at Informix Software, Inc. and a representative to the TPC, said Oracle 7 with the discrete transaction ran 30% to 50% faster in TPC-A benchmark tests than Informix's relational DBMS. While Baker was reluctant to attribute Oracle's superior TPC-A results to the discrete transaction without further investigation, he did say the discrete transaction "raises some questions as to the value and credibility of the benchmark."

Oracle's Dave Knight, a senior marketing manager at the Redwood Shores, Calif., firm, said no users had yet implemented the discrete transaction, but he attributed that to the fact that Oracle 7, which was announced last June, is still a relatively new product.

Knight added that the discrete transaction is geared for high-volume on-line transaction processing applications, which require short, simple updates. He said the French lottery is considering implementing Oracle 7 discrete transaction.

But some industry observers questioned whether the real reason Oracle developed the discrete transaction was to serve users or to inflate their benchmark scores to gain a marketing advantage.

"The TPC and Oracle are misleading the industry in a major way," said Rich Finkelstein, president of Performance Computing, Inc. in Chicago. ◘

Object Design intros NLM version

continued from page 27

cludes Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX) and the Transmission Control Protocol/Internet Protocol.

Cadkey, Inc., a vendor of computer-aided design applications, plans to be among the first developers to build an application that works with the ObjectStore NLM Server.

Schmidt

Wayne Kernochan, director of commercial systems research at Aberdeen Group, Inc., a Boston consultancy, said the Object Design-Novell partnership will bring object-oriented programming to different users than the traditional Unix-based shops that have bought into object technology.

"The downward scalability of object technology has been a point of concern, as has the upward scalability of NetWare applications," he said.

The ObjectStore NLM Server, based on ObjectStore 2.1, will be available this summer from Object Design for NetWare 3.11 and 4.0. The NLM will cost $7,500 for a developer's license and $2,250 for an end-user run-time license.

Object Design: (617) 270-9797. ◘

Florida group puts imaging to the test

continued from page 27

ment Corp. VAX system. The data is then accessible for analysis and report generation.

Copies of the images are sent to an Optika Imaging Systems, Inc. imaging server for longer term storage and can be retrieved if questions arise about a particular incident. Previously, checking on a past report meant digging through mounds of paper.

Mathes said the $300,000 imaging system, which is scheduled to be rolled out throughout Florida later this year, should pay for itself in about three years. It currently costs about $100,000 a year to process the reports, but that is for only about one-sixth the number of forms that will now be processed using the new system, he added. ◘

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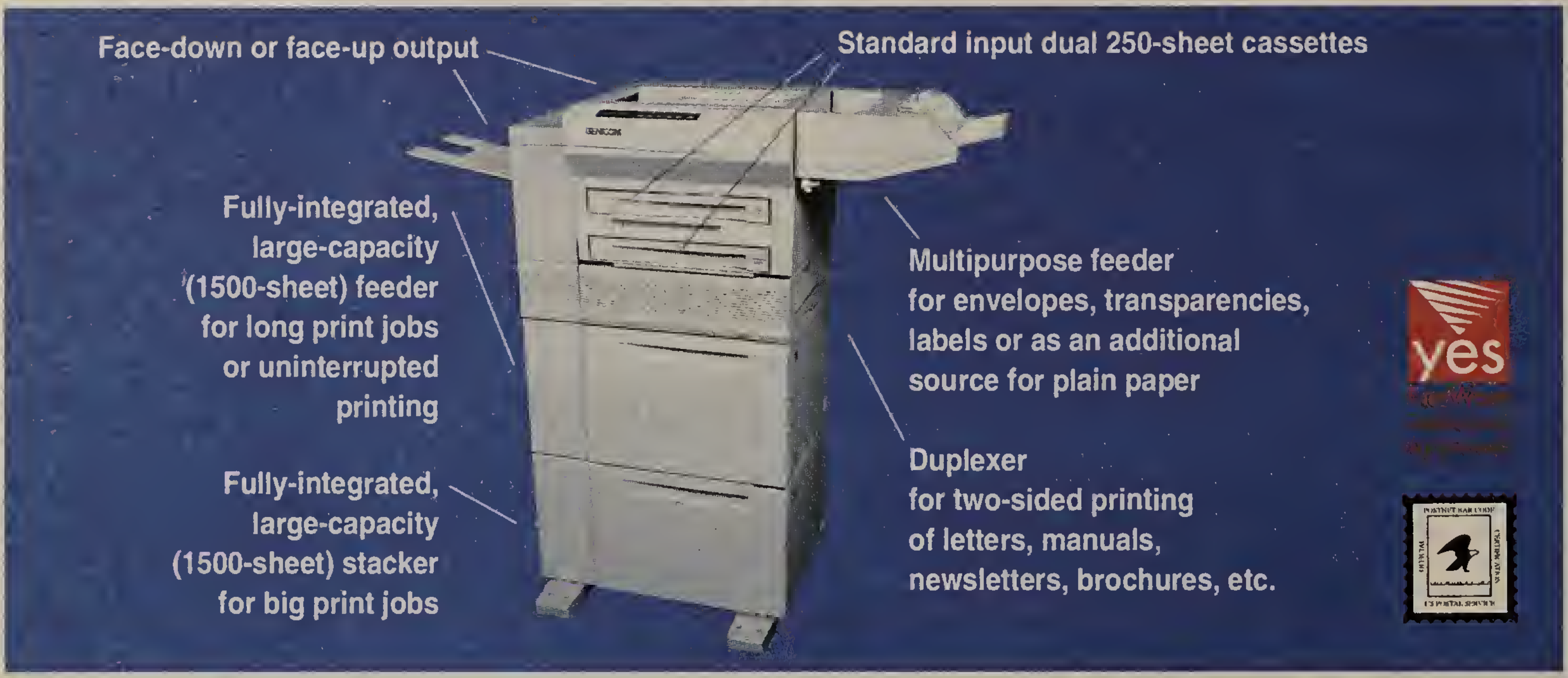
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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS, ALLIANCES AND FINANCIALS

Worth Noting

> "Neither the Federal Acquisition Regulations nor the Federal Information Resource Management Regulations make explicit reference to the concept of outsourcing. An outsourcing decision, however, must be made in conformance with these lengthy regulations."
>
> The Information Technology Association of America's "Guide to Outsourcing in the Federal Marketplace"

People & Positions

Antonio Castillo, director of networks and services for the research and development subsidiary of Spanish carrier **Compania Telefonica Nacional de Espana,** has been elected the new chairman of the **European Telecommunications Standards Institute** in Sopia-Antipolis, France.

Interlink Computer Sciences, Inc., the Fremont, Calif.-based maker of IBM Systems Network Architecture connectivity products, announced its new management appointments. **Barbara Booth,** formerly vice president of technology at Viewpoint Systems, Inc., has been appointed vice president of research and development. **William Jones,** formerly manager of Interlink's quality assurance program, was appointed director of customer service. **Tom Rappath,** formerly vice president of sales for Aristocom International, Inc., was appointed vice president of worldwide sales. ◻

ETSI's intellectual property rights policy under fire

Group asks European parliament to rule on legality.

By Ellen Messmer
Senior Correspondent

WASHINGTON, D.C. — Companies opposed to the European Telecommunications Standards Institute's (ETSI) new policy on intellectual property rights (IPR) are asking the European parliament to rule on its legality.

In a letter to the Commission of the European Communities, the Computer and Business Equipment Manufacturers Association (CBEMA) here said ETSI's Intellectual Property Rights and Undertaking policy is anticompetitive because it excludes any company that refuses to sign it from becoming an ETSI member.

Given that membership in ETSI is a practical requirement for competing in the European market, the ETSI policy on barring companies that refuse to sign the policy amounts to a form of discrimination that may violate European law, according to the CBEMA.

"Standards bodies inherently must be open entities," the association said. "If they are not, they offer an unfair advantage to their members in their areas of jurisdiction. Conditions for membership operate as a means for exclusion."

CBEMA members include Apple Computer, Inc., AT&T, Bull HN Information Systems, Inc., Compaq Computer Corp., Digital Equipment Corp., Eastman Kodak Co., IBM, Panasonic Communications & System Co. and 3M Co., among others.

Under the ETSI guidelines, companies would have to give up legal rights related to licensing their technology if they want the technology accepted as a European standard (*NW*, May 10, page 1). The Commission of the European Communities often makes ETSI standards a requirement for EC member states.

The new ETSI policy — which companies must sign in six months or face being kicked out of the organization — goes far beyond the practice adhered to by other standards bodies, including the International Standards Organization, ANSI and the Consultative Committee on International Telephony and Telegraphy, which simply require that tech-

(continued on page 30)

INDUSTRY BRIEFS

3Com settles out of court. 3Com Corp. has reported an agreement in principle to settle four consolidated class action shareholder suits. The suits, filed in 1989, alleged violations of the federal securities laws. The terms of the deal call for the establishment of a settlement fund of $9.8 million. Although 3Com officials contend that the suits are without merit, a decision was made to settle the cost and uncertainties of litigation.

Brooktrout to acquire fax-routing start-up. Brooktrout Technology, Inc., a Needham, Mass.-based maker of voice and facsimile messaging products, announced that it plans to acquire DAFCom Corp., a Dallas-based start-up specializing in fax-routing technology, for an undisclosed price. David Baker, president of DAFCom, will head the new Brooktrout subsidiary.

Asante, MicroAge pen distribution deal. Asante Technologies, Inc. and MicroAge Computer Centers, Inc. have announced the signing of a national product distribution agreement.

MicroAge, a reseller headquartered in Tempe, Ariz., will distribute Asante's entire line of networking products, including Ethernet adapters for personal computers and Macintoshes, intelligent 10Base-T hubs and network management software.

(continued on page 35)

"We can evolve our relational database into an object database because relational rows and tables just become another type of object."

▲ ▲ ▲

David Knight
Senior manager, server product marketing
Oracle Corp.

SQL database makers plot object courses

Object technology is being added to products on as-needed basis to support distributed apps.

By Bob Brown
Senior Editor

Having learned a lesson from hierarchical database vendors that failed to embrace relational technology in a timely way, relational database vendors are moving aggressively to incorporate object technology into their products.

Relational database vendors have no desire to rush to market with pure object databases, such as those from Object Design, Inc. and Ontos, Inc. Rather, these companies are looking to add object technology to their products on an as-needed basis, recognizing that it will be necessary for building and supporting distributed applications.

While many relational databases support a variety of data types via the Binary Large Objects (BLOB) method, object technology will enable them to more gracefully handle binary objects, multimedia information and complex data, such as computer-aided design data.

"The relational database vendors can't ignore object technology," said Steve McClure, an analyst at International Data Corp., a Framingham, Mass.-based market research firm. "The performance gain using an object data model rather than a relational data model for handling nontraditional data is about 100-to-1."

Oracle's object bigot

Oracle Corp. is among the SQL database vendors aware of the potential benefits of object support. Larry Ellison, Oracle's president and chief executive officer, made a passionate speech about the firm's object strategy at its recent developer's conference (*NW*, May 3, page 4).

Ellison, a self-described "object bigot," said the next major release of Oracle's database, Oracle 8, will be able to store data as objects, support an object-oriented version of SQL and provide object-oriented application interfaces.

Oracle also plans to update its development tools with object technology, he said.

David Knight, senior manager of server product marketing at Oracle, said evolving Oracle's relational database to an object database will require some significant changes to the core architecture — more than just building an object layer on top of the relational database.

The database's storage management system is among the components targeted for change, he added.

"Hierarchical and relational [databases]are totally different models," making migration virtually impossible, Knight said. "But we can evolve our relational database into an object database because relational rows and tables just become another type of object."

Knight claimed that object-oriented databases from the traditional relational database vendors will provide better management capabilities than what is found in existing object databases. The object database prod-

(continued on page 30)

Database makers plot courses

continued from page 29

ucts — most popular for engineering and design applications — tend to lack support for SQL, among other basic relational database features, he said.

HP layers it on

Some vendors — namely Hewlett-Packard Co. and Informix Software, Inc. — disagree with Oracle's claim that relational databases need to fundamentally change in order to embrace objects.

HP's OpenODB offering provides an object-oriented layer atop HP's Allbase/SQL relational database.

Douglas Dedo, marketing manager for HP's OpenODB, said the product won the research battle at HP about whether to add an object layer to an existing relational database engine or to revamp the existing engine. The layering strategy proved more effective because HP retains the strengths of its relational product, including security, support for many users and a batch of existing applications.

HP is meeting user needs with OpenODB that it could not easily meet with Allbase/SQL, he said. For example, HP is able to handle medical applications that involve patient records, X-rays and CAT scans. Following positive user feedback, HP late last year significantly lowered the price of OpenODB in an attempt to bring it to the masses.

"Life is getting more complex, so [users] are trying to create more complete information models," Dedo said. "Object technology gives you a chance to get your arms around a full model, not just a subset of it."

HP's enhancements to its object database will include integration with the Object Management Group's Common Object Request Broker Architecture and the Open Software Foundation, Inc.'s Distributed Computing Environment, Dedo said.

According to Knight, evolving from a relational database to an object database will be much simpler than moving from a hierarchical architecture to a relational one.

Informix mixes in objects

Informix is one database vendor that has bought into HP's strategy — Informix has licensed the portable OpenODB software from HP for integration with its own relational database.

According to Tony Ridoni, Informix's product-line marketing manager for application development tools, the company's object strategy is to pick and choose object technology enhancements for its product line, not to turn its database into an object database until at least the turn of the century.

> "Object technology gives you a chance to get your arms around a full model."
>
> ▲▲▲

"We are trying to be pragmatic and add object-oriented pieces to our product line that are the most useful for our general customer base, not for the small market that the object database vendors have been successful in to date," he said.

Like other relational database vendors, Informix supports BLOB and is working on an object-oriented version of its fourth-generation language tools. The revamped tools will not be in beta test until at least year end, Ridoni noted.

"One of our biggest requests from users is to provide tools for graphical and event-driven applications," he said. "From an implementation standpoint, we feel that object-oriented technology and programming will give us a great leap in productivity."

Don't forget UniSQL

Richard Finkelstein, president of Performance Computing, Inc., a Chicago-based consulting firm, said one product to look at in the relational/object database market is UniSQL, Inc.'s UniSQL/X database.

"It's really a harbinger of what's to come in this market," he said.

UniSQL/X was developed from the ground up to provide both relational and object database capabilities, said Al D'Andrea, director of sales and marketing at UniSQL, which is based in Austin, Texas.

"The challenge faced by relational database vendors is that they cannot add object capabilities without greatly affecting the performance and usability of the current product," he said. ◘

ETSI's policy under fire

continued from page 29

nology accepted as a standard be licensed on a nondiscriminatory and reasonable basis.

ETSI is demanding that companies not wanting the institute to consider their technology for inclusion in a standard notify the organization within 180 days after an ETSI technical group issues a work statement for a standard. Failure of notification would give ETSI the right to include the technology as a standard under licensing terms dictated by the institute.

Many companies consider this demand unreasonable, saying it is impossible to know exactly what technology would be appropriate since the work statement is issued in general terms, while standards evolve in the course of a year or two. The volume of work statements from ETSI — currently, there are about 1,200 outstanding — also makes the notification demand difficult.

"The requirement to sign the undertaking in order to be a member of ETSI sets the stage for a collective boycott to eliminate nonmembers," said John Pickett, CBEMA president, in his letter to

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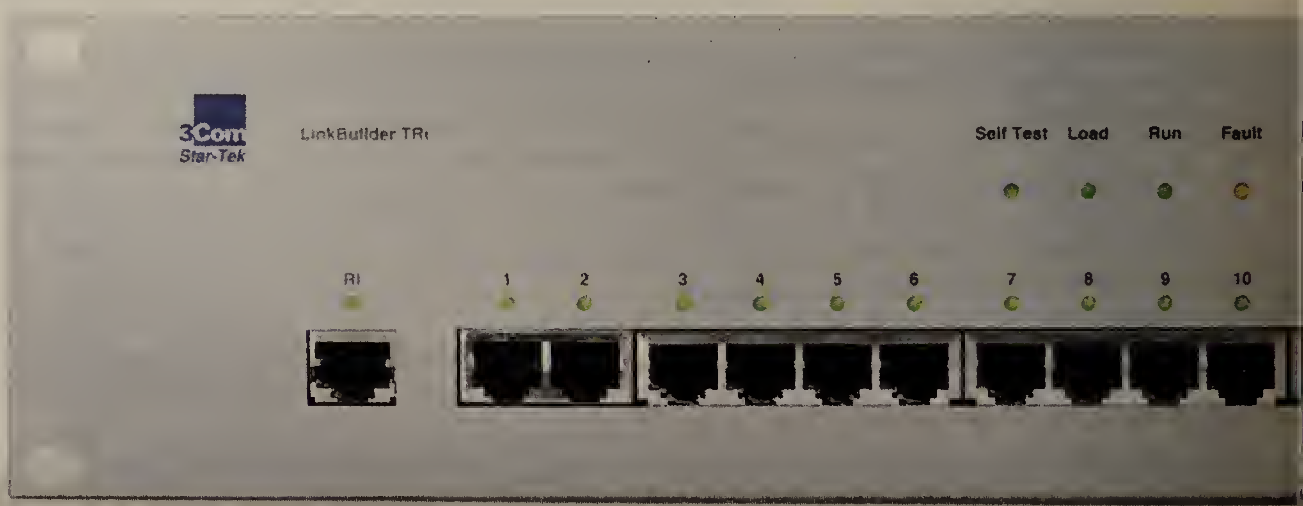

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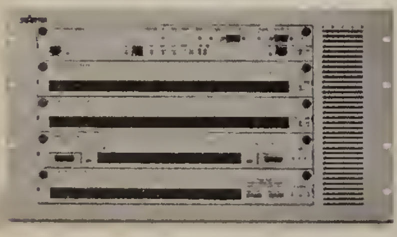

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European Commissioner Karl Van Miert. “It also means that ETSI members, through joint action, would be able to obtain compulsory access to the fruits of innovation of other ETSI members that choose to remain in ETSI.”

The heads of the European divisions of Apple Europe, IBM Europe and Motorola, Inc. have written to European Commissioner Raniero Vanni d'Archirafi of the European parliament, calling the ETSI policy a “compulsory binding arbitration scheme [that would] jeopardize the community objectives of providing necessary protection and the adequate compensation of intellectual property rights.

“The overall approach is particularly ominous to those ETSI members with extensive research and development programs and large patent portfolios,” Apple, IBM and Motorola stated in the letter.

Other trade groups, including the Telecommunications Industry Association (TIA) and the European Association of Manufacturers of Business Machines and Information Technology Industry (EUROBIT), are also opposed to the ETSI policy.

“Taken as a whole, it appears to give unfair advantage to ETSI members, not only in the EC market, but the global market, as well,” said Peter Bennett, vice president of the TIA.

Bent on control

Details in the ETSI document reveal an unprecedented effort to control the business process.

The document, which shows a bias toward monetary renumeration for technology reasons, discourages the common practice of cross-licensing — where two firms simply exchange the right to use technology without requiring the payment of royalties.

Other ETSI rules would require a company that has licensed its technology to another firm to notify the earlier licensee if another company later receives licensing on terms “more favorable in their entirety.”

The licensee, which believes it has less favorable terms, could make the licensing company replace the terms and conditions of the license with the presumably better arrangement or terms the two parties agree on. The ETSI policy makes the institute the final arbiter in any dispute.

Although ETSI would press its own nondiscrimination rules on its members, the organization will not require ETSI members to treat non-ETSI members with the same consideration, meaning those firms might have to pay more to license ETSI technology.

EUROBIT has taken the position that ISO's voluntary licensing scheme has worked well in the past, noting that ETSI's discriminatory treatment of non-ETSI members would invite retaliation against European companies outside of the EC.

U.S. firms balk

About 20 U.S.-based companies, some with large patent portfolios such as AT&T, IBM and Motorola, are ETSI members. IBM has refused to sign the ETSI policy document, calling it an unfair, compulsory licensing scheme. The Netherlands-based N.V. Philips opposes the ETSI policy, but German-based Siemens AG and French-based Alcatel N.V. support it.

Frede Ask, deputy director of ETSI, said the organization is setting the 180-day notification requirement so its technical groups can avoid wasting time considering technology that it might later find is unavailable for licensing.

Ask said ETSI's new IPR Policy has the tacit approval of the European parliament. “If the Commission thought that ETSI was in the process of adopting something illegal, they would have stopped us,” he said.

Bill Ellis, IBM counsel, said there appears to be disagreement within the Commission of the European Communities over the ETSI policy. In the European parliament's policy-making groups, called directorates, opinion about the ETSI policy is divided. The Directorate General XIII (DG-XIII) on telecommunications supports the ETSI IPR policy, but the DG-III group on intellectual property opposes it, he said.

The ETSI policy — last year quietly opposed by industry and the U.S. government, both of which had hoped to dissuade ETSI from adopting it — is now regarded as an obstacle to fair trade.

A U.S. Department of State representative at the March ETSI meeting condemned the proposal as ETSI members gathered to put the policy to a vote.

Now that it has been adopted and the final document has been issued, the U.S. Trade Representative's office has identifed it as a significant obstacle to fair trade in official communiques with the EC. ◼

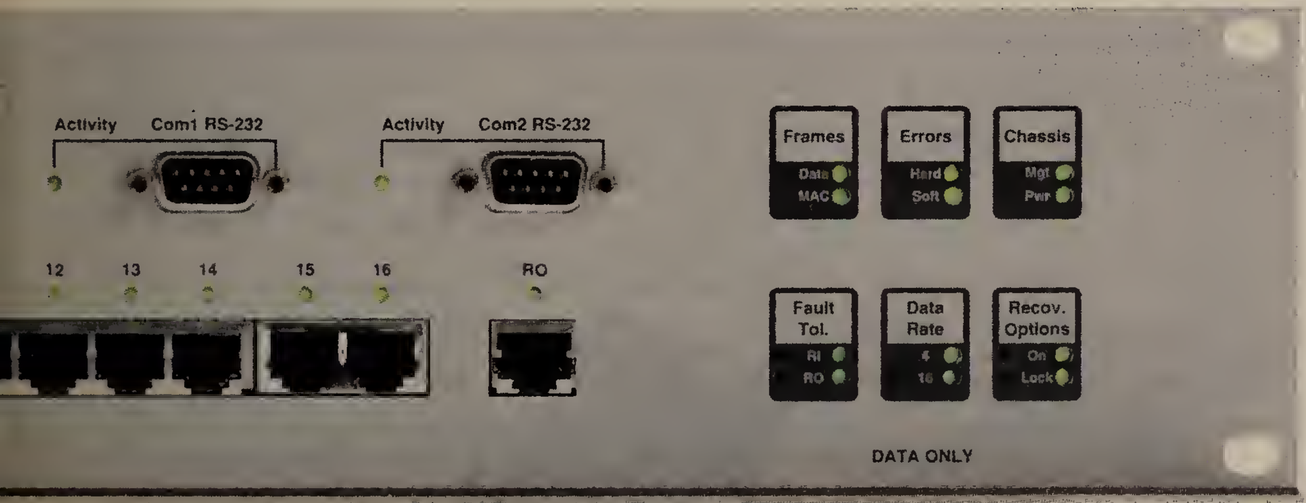
European standards group lays down the law

Terms of the European Telecommunications Standards Institute's (ETSI) Intellectual Property Rights (IPR) Policy and Undertaking:

- Requires members to notify ETSI within 180 days after work has begun on a new standard if they don't want their technology considered for use. Failure to do so gives ETSI the right to adopt their technology as a standard through compulsory licensing at terms decided by ETSI.
- Discourages nonmonetary exchange of technology, such as cross-licensing where companies exchange technologies without demanding royalty payments.
- Makes ETSI the final arbitrator between the licensee and the licensor.
- Makes the ETSI IPR Policy and Undertaking retroactive, meaning it supersedes any earlier agreements made with ETSI.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: *NETWORK WORLD*

ps working. It prevents mistakes.
You do have to plug it in, however.



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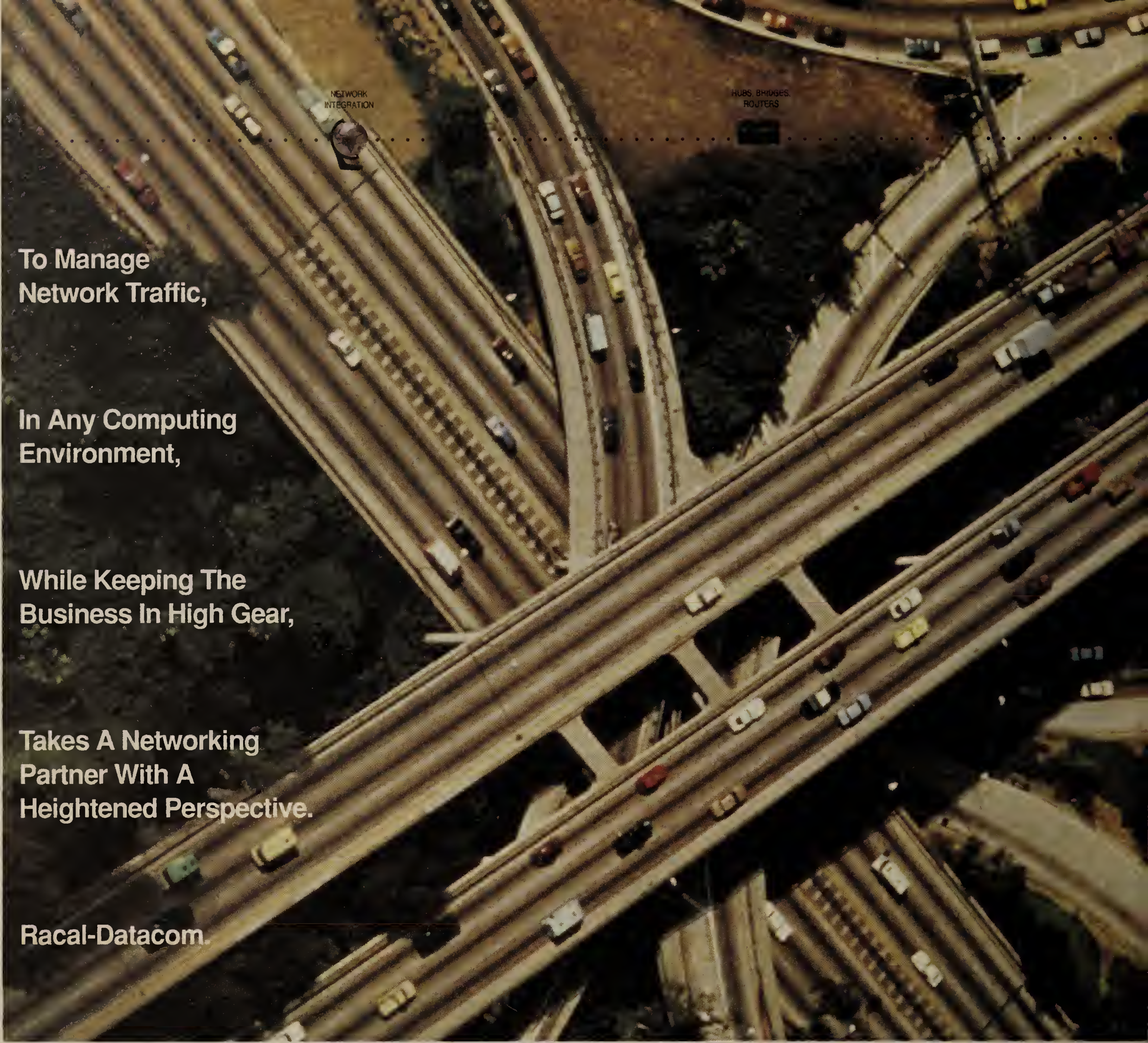
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Circle Reader Service #20

MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USER GROUPS AND ASSOCIATIONS

Worth Noting

"Since a reliable network is paramount to our company's success, we've tried to get our network infrastructure to mirror that of our business infrastructure in terms of consolidating all the key pieces in one central location."

Bill Branson
Senior network engineer
Frank Russell Co.
Tacoma, Wash.

Manager Minutes

The probability of a U.S. employee being fired has increased dramatically over the past year, according to a survey developed by and conducted for **Accountemps,** a temporary staffing service for accounting, bookkeeping and information systems personnel.

As part of the survey, 150 executives from the nation's 1,000 largest companies were asked for their estimate on what percent of all U.S.-based employees would be fired at some point in their career span.

The mean response of these executives was 33%, which was somewhat higher than the response of 25% taken from a similar Accountemps poll conducted a year ago.

However, there is good news. Seventy-nine percent of the executives surveyed said being fired does not carry the same stigma that it did five years ago. The reason, they said, is because firings are often the result of large-scale layoffs and cutbacks and have little or nothing to do with poor job performance. ◻

THE INTERNET

BY ED KROL

Internet users building electronic card catalog

The Internet's ability to make information available in new and exciting ways has made for some strange human networking.

One of the most interesting new collaborations is between networkers and librarians. Volunteers from each community are working together to standardize a way of permanently referring to on-line resources.

When the Internet was all computer geeks, people would say things like "Pick up the hosts file in the etcee directory at the NIC." Everyone on the net knew how to translate that jargon into a set of actions that would retrieve the appropriate file.

Now, real people using the Internet are demanding higher level, more usable applications. In order to build these applications, developers need a way to point to resources. This standard pointer format became known as a Uniform Resource Locator (URL).

Finding a standard way of pointing to resources is amazingly similar to a problem the library community wrestled with for years: how to cite on-line documents. (To the uninitiated, this problem can be rephrased as "What is the standard footnote format for a file?")

Since we, the networking community, were invading their turf, librarians invaded ours. They began coming to Internet Engineering Task Force working group meetings.

One of the first things that happened in these meetings was the realization that URLs are not a solution. They are actually just a formalization of the problem.

If a URL points to a file and someone moves that file, the URL's usefulness is lost. If you cite a book, you don't describe it as the sixth book on Shelf 12 at the U. of I. library. You refer to it symbolically by name.

Resolving nomenclature

Thus, discussions of late have centered on developing Uniform Resource Names (URN).

URNs are the appropriate long-term solution, but before they become a usable tool, some technical and procedural problems need to be worked out. The solutions to most of the technical problems are obvious, such as the deployment of servers that will tell applications where resources reside.

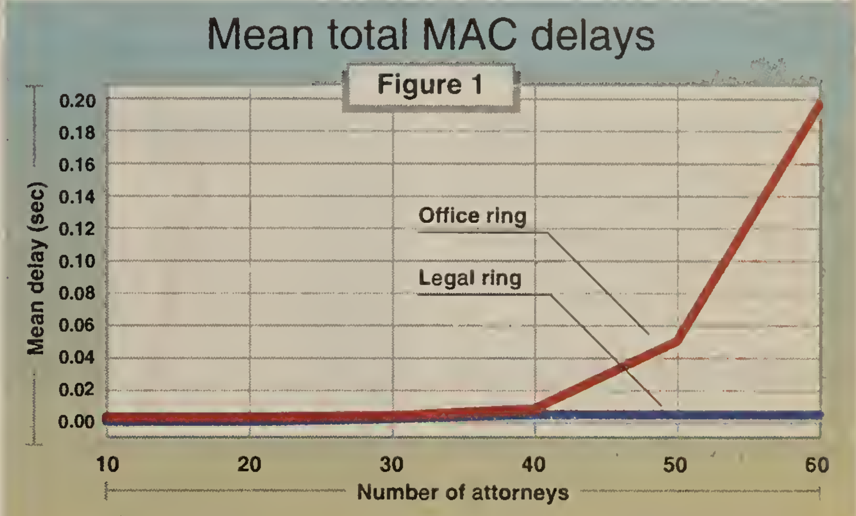
The procedural questions, however, bring the two communities to loggerheads.

For example, there is the seemingly simple question: When are two resources the same and, hence, have the same name? Computer scientists view equivalency as an absolute, saying things such as "I want to be able to binary compare two files, and if they match, they should have the same name." Librarians, on the other hand, answer the question with a rousing "It depends on context."

If a patron wants a quote from one of President Clinton's speeches, it doesn't really matter if the file is an ASCII version or a Postscript version; either would do.

In order to get software out the door, URLs are being standardized in spite of their problems. This gives us some breathing room to work out all the details of URNs. Sometimes the group finds it easier to argue about the acronyms than about the problem, spending a lot of time on whether the acronym stands for Universal Resource Names or Uniform Resource Names.

Clearly, if the problem ever gets resolved, the acronym will really stand for Ubiquitous Resource Name. ◻



A simulation based on projected growth shows when 1 of 2 networks needs to be segmented. Contention for the office ring becomes significant at around 40 attorneys (120 total users) and segmentation is then recommended.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: NETWORK PERFORMANCE CORP., OUNKIRK, MD.

Applying simulation to network planning

An examination of how simulation tools can help managers increase peformance, plan for change.

First in a two-part series.

By Andrew Jazwinski and Brian Laszakovits
Special to Network World

As enterprise networks supporting mission-critical applications grow in size and complexity, network performance becomes a critical issue. "Back-of-the-envelope" analyses no longer cut the mustard. More precise methodologies for analyzing design and cost/performance trade-offs are needed.

In response, vendors have introduced a range of tools for simulating network performance that can be applied to a variety of network planning and design tasks.

The first piece of this two-part article describes a number of the issues involved in simulation and the benefits and value of performance analysis.

The second part, which will appear next week, will present a detailed case study showing how simulation is used in network segmentation and backbone design.

The study will introduce a methodology for using a simulator, starting with data collection issues and ending with interpretation of simulated performance plots.

Simulation usage

Although there are a number of simulators on the market, to get an idea of what the tools typically consist of, we will focus on Comdisco Systems, Inc.'s BONeS PlanNet enterprise network simulator.

PlanNet allows network managers to graphically represent the network by placing and connecting icons that represent network components, describe their properties and specify network traffic to be simulated. A wide range of network and application performance statistics may be collected and plotted to give insights into various performance trade-offs.

PlanNet comprises a simulation engine and a number of modules (models) for simulating local-area network segments, wide-area network links, interconnect devices (such as bridges and routers) and traffic generators (such as traffic sources and client/server interaction). Each module collects performance statistics when statistics collection is turned on. These collectors report primarily on delays, utilization and throughput for the respective modules.

A key PlanNet feature allows you to automatically vary many of the model parameters. For example, you can vary the number of users on a LAN segment so that in a single simulation run, PlanNet will simulate your network model for a range of values for the parameter specified. The simulation produces comparative performance plots, showing the performance of your network as the selected parameter varies over the specified range of values.

(continued on page 34)

Using simulation for net planning

continued from page 33

These features make PlanNet convenient for sizing, capacity planning and numerous what-if analyses for the various devices, LAN segments and WAN links in your network.

The following sections identify and illustrate some of the many applications of simulation in network management, showing what simulation can be used for.

Segmentation, backbone design

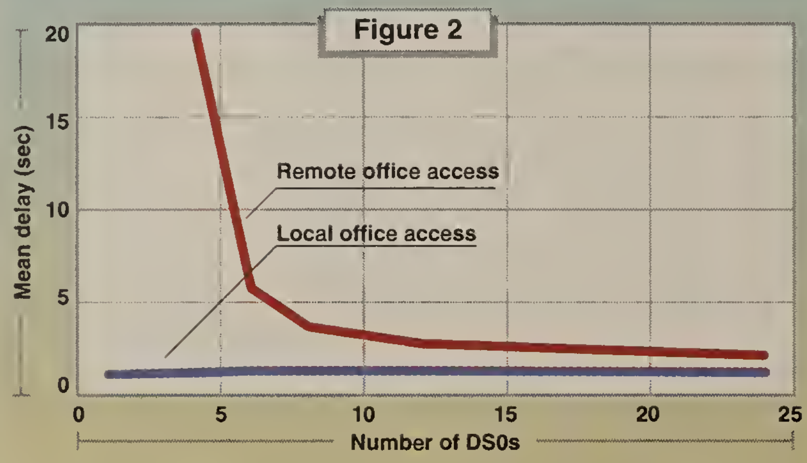
As network usage and loading increases, it will eventually become necessary to further segment the network. Network segmentation and backbone design, therefore, deal with analyses of network capacity to support additional users and applications, and a performance evaluation of various segmentation and backbone designs.

If done proactively, there will be no surprises and the network manager will be able to plan and budget for the required network changes.

Key performance measures in segmentation analysis include:

- Channel delays, utilization and throughput as a function of the number of users or the application load.
- Message or application transaction end-to-end delay, or response, as a function of the number of users.

Transaction delay vs. number of 64K bit/sec channels



Simulation reveals the bandwidth required to support document access from remote locations. (Local access times are shown for reference.) End-to-end transaction delay is a function of link bandwidth. A minimum bandwidth of 512K bit/sec (eight 64K bit/sec channels) is required for reasonable transaction response.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: NETWORK PERFORMANCE CORP., DUNKIRK, MD.

As an example of this, PlanNet performance plots that show mean total media access control layer channel message delays on two 4M bit/sec token rings are presented in Figure 1 on page 33.

The "knee" on a delay curve shows when the contention for a shared resource — in this instance, the communications channel — becomes significant. And, of course, application transaction response time is of ultimate interest to your customers, the network users.

As you well know, excessive transaction response time will cause your telephone to ring.

This proactive use of simulation will enable you to better plan for and manage change, saving your company money. The cost savings come from avoiding overdesign and being able to implement network expansions just in time.

Link sizing, capacity plans

As corporate networks expand, more bandwidth will be needed to support users at remote office sites. But there will inevitably be the trade-off between performance and bandwidth costs.

WAN link sizing and capacity planning deal with analyses of circuit capacity to support projected growth and the sizing of these circuits for satisfactory application transaction response. Here again, proactive use of simulation can not only save money, but also result in better service for network users.

Key performance measures to look at include:

- Application transaction response, link delays and utilization as a function of link speed (for sizing).
- Application transaction response, link delays and utilization as a function of the number of users (for capacity planning).

A link-sizing analysis using PlanNet generated the performance plots exhibited in Figure 2 on this page, which shows application transaction response as a function of link bandwidth.

WAN link performance analyses using simulation can help optimize performance while, at the same time, minimizing costs. You know explicitly how much performance costs, not just how much bandwidth costs, so that you can make informed business decisions.

Sizing, capacity planning

Another key use of simulation in network management is in server planning.

Is it the communications channel or the server that is likely to cause excessive delays and unacceptable transaction response? Which will create bottlenecks first? When will the server become a bottleneck? Is the bottleneck in the server CPU or disk subsystem? How should the server be configured for satisfactory application transaction response?

For planning and budgeting purposes, it is nice to know when you will run out of server capacity.

It is also helpful to know whether it will take a faster server disk or CPU to bring application transaction response down to acceptable levels.

Simulation supports the reso-

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lution of such network management issues. It can help you size your servers for optimum transaction response, as well as help you plan and budget your server capacity upgrades.

> Simulation can be beneficially applied to a wide variety of network planning and design issues.
>
> ▲▲▲

The key performance measures for server sizing and capacity planning are:

- Application transaction response, server CPU, and disk delays and utilization as a function of server CPU power and disk speed (for server sizing).
- Application transaction response, server CPU, and disk delays and utilizations as a function of the number of users (for capacity planning).

Other simulation apps

Simulation can be beneficially applied to a wide variety of other network planning and design issues and various what-if planning studies.

A good foundation, or reference, for such analyses is a baseline performance simulation and analysis. This consists of simulation models as well as performance simulations of your current network to serve as a baseline for planning and troubleshooting.

The baseline not only serves as a reference for simulating various what-if planning scenarios, but it can also assist in troubleshooting network performance problems. Departures from the baseline performance can then be diagnosed as to whether it resulted from network growth or some hardware or software problem.

Other simulation applications include:

- **Router and bridge sizing and capacity planning.** Sizing bridges and routers for required application transaction response and analyses of their capacity to support additional users and applications.
- **Application traffic engineering.** Analyses of performance implications of network application architectures and deployment strategies.
- **Reconfiguration analyses.** Analyses of performance implications of proposed net reconfigurations.
- **Network performance enhancement.** Enhancement of application performance through optimum system sizing and configuration.

In addition, a wide variety of special logical design and planning studies, such as tuning token rings using priorities, synchronous bandwidth allocation on Fiber Distributed Data Interface networks and many other design analyses can be performed with simulation. ◻

Jazwinski is president and Laszakovits is a consulting network engineer with Network Performance Corp. (NPC). NPC, located in Dunkirk, Md., provides network design consulting services using state-of-the-art design simulation tools. They may be reached at (301) 855-4600.

Industry Briefs

continued from page 29

Investment funding. A group of investors led by Canaan Parters, Inc. of Menlo Park, Calif., have given $9.1 million to Kalpana, Inc. for funding of research and development programs related to Kalpana's Ethernet switching business.

News by phone. Nynex Corp. and the Long Island, N.Y., publication *Newsday* agreed to jointly test an information service this fall that will give subscribers access to 10 categories of news information that will automatically be uploaded and deposited in the user's voice mailbox each day.

NET shows net loss. Network Equipment Technologies, Inc. (NET), the Redwood City, Calif.-based manufacturer of T-1 multiplexers, reported a net loss of $11.1 million for fiscal year 1993, compared with a net loss of $11.2 million for the previous year.

Revenues for 1993 were $218.8 million, up from $180.8 million the previous year. NET said the loss stemmed from a $17 million charge related to its merger with Adaptive Corp.

NetFRAME's record. NetFRAME Systems, Inc. posted record revenues of $13.6 million for the first quarter, up 71% from the corresponding quarter last year. The Milpitas, Calif.-based maker of superservers reported first-quarter earnings of $1.8 million, up 359% from first-quarter 1992.

Retix posts loss. Retix reported revenues of $13.6 million for the first quarter, down 18% from the same quarter in 1992. The Santa Monica, Calif.-based supplier of Open Systems Interconnection software and network routing equipment reported a first-quarter net loss of $1.2 million, compared with earnings of $1.7 million in first-quarter 1992.

Bytex feels the bite. Bytex Corp., a Westborough, Mass.-based network equipment manufacturer, reported revenues of $9.8 million for the first quarter, a 10% decrease from the similar quarter last year. Bytex posted a net loss of $1.2 million for the quarter, compared with a net income of $145,000 for first-quarter 1992. ◻

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OPINIONS

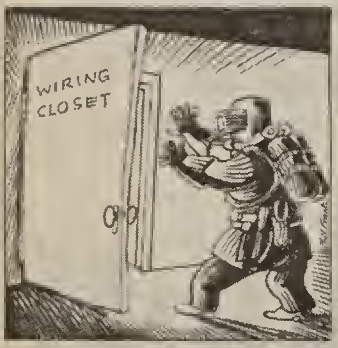
STANDARDS

BY EMILY GREEN

At last, a really useful networking standard

It looks like the trend toward standardization has hit the last dark corner — literally — of the data communications industry. Network managers, brace yourselves for EIA/TIA 561, the new standard for your . . . wiring closet. The proposed new version of this building wiring specification, recently published by the Electronic Industry of America, puts forth, for the first time, the EIA's recommended dimensions for commercial office wiring closets based on the approximate square footage of the space it serves.

I agree that the problem is too much equipment in the closet. But is the solution just to make the closet bigger? Or might it instead be to rethink the design of the network, to locate some sensitive and valuable electronics equipment in a more appropriate location with adequate space, ventilation, cooling and technical support? That would seem to get at the root of the problem more effectively. It may even explain further use of the "collapsed backbone" network architecture, in which local-area network segments are drawn individually back to a central location where they can be internetworked, troubleshot and connected to "virtually local" file servers that are part of a central support and backup program.



But out of concern for the folks who can't enlarge their current closets (it could mean sacrificing the new VP lounge, after all, and what career-conscious network manager wants to suggest *that*) or don't want to redesign their networks, perhaps what the EIA needs is an addendum to this wiring closet standard. They could at least make existing closets work better by planning for a few additional items:

- **Kneepads** for more comfortable access to equipment mounted way down on the rack, but more importantly, for offering prayers for a successful installation of the latest routing software.
- **Dorm-sized fridge** to keep plenty of Jolt soda and Twinkies handy for those late-night troubleshooting sessions. Also good for auxiliary cooling; when the heat from all those watts gets too much, you can open the door or use the ice cubes.
- **Band-aids and Bactine** for knuckles scraped trying to get at equipment that barely clears the side walls by the rack.
- **A miner's helmet with head lantern.** How else are you going to check the revision levels of those shadowy programmable read-only memories on the bridge card that are inside the hub that's under the router that's squeezed into the corner behind the cobwebs?
- **Various holy objects** for brandishing at uncooperative gear, when all else fails. (One manager I know swears by a scary contraption of pigeon bones tied with a lock of Bob Metcalfe's hair.)

Contact me if you want to add to my list for the EIA. And while they're at it, let's ask them to take up the matter of minimum dimensions for our *offices*, too! ☐

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EDITORIAL

Network-centric view paying off for Lotus

What can the spreadsheet, that tried-and-true staple of desktop computing, show us about the future of networking?

Plenty, if it happens to be Lotus Development Corp.'s 1-2-3 Release 4 for Windows, which brings the spreadsheet into the rarified world of real group-enabled software. It's no secret that Lotus struggled with its early Windows spreadsheet, but the latest release is being hailed in reviews and, if it delivers, is likely to prove invaluable to customers.

Release 4 incorporates Version Manager, which is based on Lotus' Chronicle technology and allows multiple users to collaborate in building and modifying spreadsheets. The technology is particularly powerful when used in conjunction with Notes.

OK, you say, that's good news for 1-2-3 users and Lotus, which may win back some lost market share. But there's more to the announcement than that.

The new version shows just what application vendors ought to be providing in the way of software that maximizes return on network investments. It shows what can be delivered when a company makes a significant investment in network-enabling its applications.

Compare the Lotus approach to that of Microsoft Corp. To date, Microsoft has offered a couple of tools — Electronic Forms Designer and Workgroup Templates — that let information systems staffers build simple work flow applications and bring some networking capabilities to existing Microsoft applications. Microsoft is promising other group-enabling features, but its do-it-yourself component strategy pales in comparison to the integrated networking approach Lotus is banking on.

Spreadsheet rival Borland International, Inc. has been even less clear about plans for group-enabling its applications.

Even if you aren't buying a spreadsheet or considering Notes, your time would be well spent examining Lotus' technology for group-enabling applications. It will help you in analyzing other vendors' strategies and understanding what they need to deliver to help you make the most of the enterprise networks you've built. ☐

DATABASE UPDATE

BY RICHARD FINKELSTEIN

Use client/server for benefits, not just to save money

Users who embark on major client/server projects purely to save money may be very disappointed. While client/server has many benefits, particularly in improving application functionality and flexibility, it is also expensive and risky. Before implementing client/server technology, net managers need to gauge its potential risks and rewards.

One of the best reasons to move into client/server is to improve the capabilities of end-user applications. Intelligent applications increase productivity and make an organization more competitive. With personal computers at the desktop, developers can build an enormous amount of intelligence into the applications.

Information can be gathered from many sources and consolidated at the workstation. Users can increase the usefulness of the data by utilizing powerful desktop software, such as spreadsheets and other decision support tools, to massage the data into an appropriate form.

Perhaps a more subtle benefit of client/server is its ability to defer costs. Organizations can develop applications using software and hardware at a fraction of the cost of their mainframe or high-end minicomputer counterparts. The applications may eventually be deployed on more high-end platforms, but it is not necessary to make these decisions or purchases until the application has been substantially developed and proven. This allows an organization to proceed with high-risk projects with less up-front costs.

Another positive aspect of client/server is that it allows for incremental growth. Network equipment can be upgraded or new applications added incrementally without affecting existing applications and users. Organizations can also incrementally add new functionality, such as migrating a character-based application to a graphical user interface-based environment.

Finally, client/server can improve network performance and reliability. Client/server applications relieve network bottlenecks by minimizing the amount of data transfers. Large databases can be accessed from a PC by using highly optimized database servers designed for handling high transaction volumes and complex queries.

> Users have freedom to use applications in ways that maximize productivity.
>
> ▲▲▲

Since users don't have to be as concerned about performing work that clogs the network or brings the file server to its knees, they have greater freedom to use applications in ways that maximize their productivity. While client/server applications have their own bottlenecks, they are more manageable since the database is centralized and controlled by a tunable database server.

The benefits of client/server must be weighed against its tangible costs and intangible risks. Other solutions, including multiuser Unix systems or the often maligned mainframe alternative, often provide a better balance of risks and rewards.

Organizations are often surprised by the costs of developing, maintaining and administering client/server applications. Education costs are substantial, and learning curves are long. Application development tools are frequently immature and buggy. Operating systems, such as Microsoft Corp.'s Windows and Novell, Inc.'s NetWare, are designed with inadequate application protection and without basic preemptive scheduling algorithms, which affects application stability, predictability and overall system throughput.

It also affects development because programmers spend an inordinate amount of time debugging operating system and solving connectivity problems instead of building applications. Often, organizations must increase, not decrease, staff in order to maintain new client/server applications.

Some organizations have managed to implement client/server applications without the hassle of buggy software and have decreased staff, as well. But these appear to be the exceptions. Most of the industry appears to be struggling with the birth of client/server, and some organizations are actually delaying their first attempts to implement this new technology.

My advice is to use client/server when it provides a clear advantage in functionality, flexibility or performance. Do not embark on client/server simply to save money — it costs more than you think. ◘

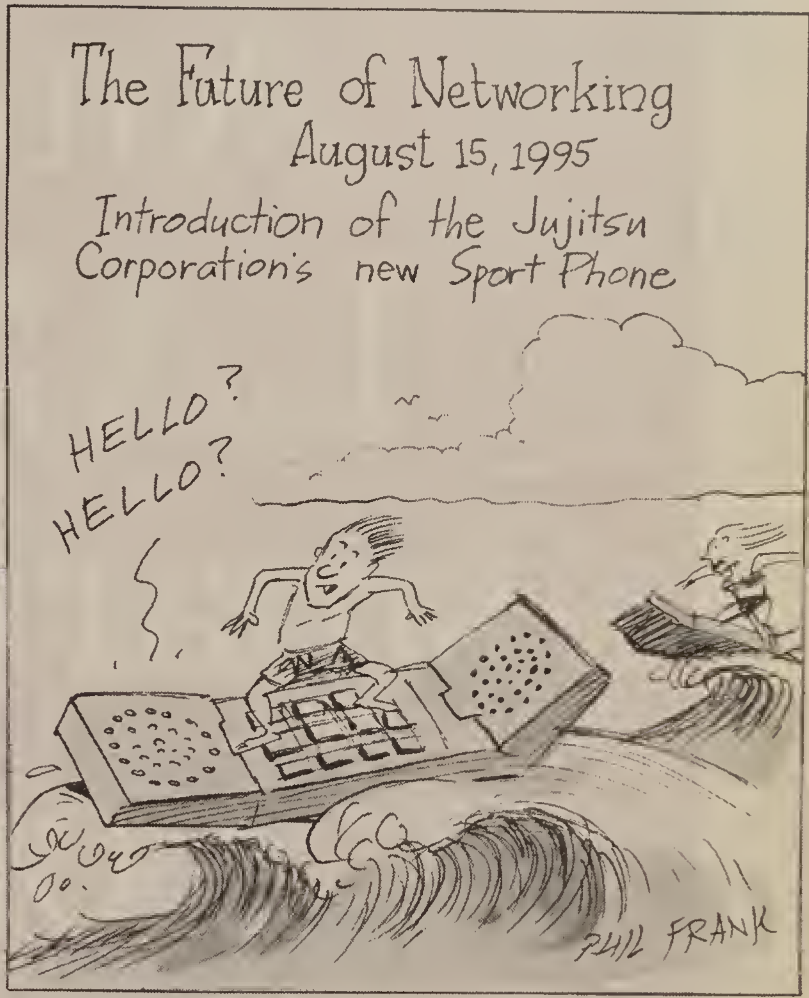
Finkelstein is president of Performance Computing, Inc., a consulting company in Chicago that focuses on client/server and rightsizing applications. He can be reached at (312) 549-8325 or via Compuserve at 72240,2536.

ATTENTION GROUP COLLABORATION TOOL VENDORS: *Network World* invites you to participate in a product survey for a Buyer's Guide to be published Aug. 9. This Buyer's Guide will examine the critical selection criteria and current market trends that influence the purchase of group collaboration tools.

To obtain a survey form, call Kyle Nitzsche, associate features editor, at (508) 820-7427. Requests for survey forms must be received by Monday, May 31.

TELETOONS

BY FRANK AND TROISE



LETTERS

NeXT comes first

In the article "Taligent breaks the silence on its network-ready OS" (*NW,* April 12, page 1), Peter Kastner, vice president of Aberdeen Group, Inc., says, "There are zero pure object-oriented operating systems out there now."

This is not true. I count one such system, the NeXTStep operating system from NeXT Computer, Inc. NeXTStep has been installed on more than 50,000 computers and becomes available on Intel Corp. 486 machines this month.

Taligent, Inc. and Microsoft Corp. may eventually deliver a good object-oriented operating system, but it certainly won't be the first one available.

Carl Wright
President
Lynn-Arthur Associates, Inc.
Ann Arbor, Mich.

Decoding facts

I applaud the stand you take in your editorial on the Clipper Chip (*NW,* May 3, page 32). I noticed one thing while reading it, however.

In the article, you wrote, "Unless the legislative branch got behind this idea and outlawed production and ownership of all other types of encryption technology — including the Data Encryption Standard — crooks will continue to use the 'secure' alternative. So what is gained?"

This is true but misleading on two counts. If encryption were outlawed, crooks would still use it, but the implication is that outlawing encryption might be effective. Secondly, the only users of untappable encryption mentioned were crooks — suggesting, subliminally, that only crooks would want to use encryption that interferes with government wiretaps.

I consult on encryption for

(continued on page 61)

Want to respond to an article or opinion in Network World? *Mail typed letters to Editor,* Network World, *161 Worcester Road, Framingham, Mass. 01701, or fax them to (508) 820-3467. Transmit your response via MCI Mail at 390-4868 or to our Bulletin Board System. (See page 2 for BBS instructions.) Letters may be edited for space and clarity.*

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New kid grows up

Fuller product lines and standards support take risk out of inverse mux selection.

BY DANIEL BRIERE AND CHRISTOPHER FINN

The complex task of pooling low-speed switched and dedicated links to support bandwidth-intensive applications is akin to keeping five balls in the air at once. But a 2-year-old class of network access devices — inverse multiplexers — is helping network managers pull off this juggling act.

Driven by a growing number of applications, such as videoconferencing, local-area network interconnection and private network disaster recovery, inverse muxes are coming into their own. Inverse muxes combine the functions of channel banks, data service unit/channel service units (CSU) and Integrated Services Digital Network terminal adapters with the ability to allocate variable amounts of switched and dedicated bandwidth as needed.

The Short List

Inverse mux hub:

☑ Ascend Communications, Inc. Multiband Max

☑ Teleos Communications, Inc. NetworkHub Model 200

Multiapplication inverse mux:

☑ Ascend Multiband Plus

☑ Teleos NetworkHub Model 60 and VideoHub Model 60

Complete details about The Short List appear on page 59.

When necessary, an inverse mux can spread a high-speed data stream coming from a local device across multiple lower speed wide-area circuits. An inverse mux at the receiving site takes data from individual circuits and aggregates it back into a single high-speed channel.

Inverse multiplexing is just one of the functions these products perform. They can manage simultaneous access to different carrier services in a static or call-by-call manner, as well as monitor private network circuits and cut over to switched services automatically if a private line fails or is about to start blocking calls due to unavailable bandwidth. They can also provide wideband channel support for such ISDN network services as switched 384K and the upcoming ISDN multirate, which enables users to request a specific amount of bandwidth when they place a call.

But at a base level, all inverse muxes run software that allocates bandwidth for high-speed applications in increments of at least 56K or 64K bit/sec. For example, an inverse mux can satisfy a request for a 384K bit/sec circuit by allocating six switched 64K bit/sec circuits. When the 384K bit/sec data stream generated by the application hits the inverse mux, it is broken into 64K bit/sec increments and transmitted over the switched 64K bit/sec circuits, a process known as Nx64K bit/sec inverse multiplexing.

Some inverse muxes use increments of 384K bit/sec, enabling a T-1 data stream, for instance, to be transmitted over four switched 384K bit/sec circuits, a process known as Nx384K bit/sec inverse multiplexing.

> *Widespread availability of switched digital 56K bit/sec services, combined with inverse multiplexers, can provide 384K bit/sec service for as little as 60 cents per minute in the U.S. This translates into $36 per hour for videoconferencing.*

Still other inverse muxes enable users to dedicate a circuit to support the first increment of bandwidth generated by a device and establish switched connections when the device requests more bandwidth than the dedicated circuit can provide.

For instance, an inverse mux will pass the first 384K bit/sec of traffic generated by a LAN router over a 384K bit/sec fractional T-1 link. When the router generates more than 384K bit/sec of traffic, the inverse mux can split the additional load into increments of 64K bit/sec for transmission over switched 64K bit/sec circuits.

An emerging class of inverse muxes can split traffic into T-1 increments and route them over dedicated circuits (see story, page 51).

Reduced risk

Purchasing an inverse mux was a risky proposition only two years ago. There were few established vendors, product lines were incomplete, and there was little in the way of standards. But that has changed.

A growing number of vendors offer full product lines. They have also formed the Bandwidth on Demand Interoperability Group to create an inverse multiplexing protocol that enables disparate inverse muxes to interoperate (see story, page 53).

The maturation of the marketplace is making the selection process easier. Users can now compare products using a fairly straightforward set of criteria: architecture, support for the right mix of carrier services and local device interfaces, application support, device management and control, support services and price.

Inverse muxes use a switching matrix or shared-bus architecture to

(continued on page 46)

Inverse multiplexers (I-mux) (continued on page 60)

Company	Product	Type	Max. number and type of trunk- and user-side interfaces								Max. number and type of user-side interfaces							Max. throughput (bit/sec) (1)	Expansion	I-mux protocols	I-mux increments (bit/sec)	Max. no. concurrent I-mux calls	Integral:	Net monitoring	Mgt.	Video MCU support	Price range/ Warranty period (months)
		B = Shared bus S = Dynamic switching	T = Trunk-side U = User-side	T-1	T-1 ISDN PRI	E-1	E-1 ISDN PRI	ISDN BRI	DDS	Switched 56K bit/sec	V.35	V.25bis	RS-449	RS-366	RS-232	X.21	Nx56/64K bit/sec I-mux		Number of interface card slots (2)	B = BONDING H = H.221 P = Proprietary	A = 56/64K B = 384K D = Base plus varied channels		B = Bit error rate tester C = Channel service unit P = Protocol analyzer	C = Carrier U = User	C = Control panel P = PC or terminal needed S = SNMP		
Adtran, Inc. (205) 971-8000	ISDN Service Unit	B	T					1			1	1		1	1		2	128K	0	B	A	1	B, C				$995/60
			U																								
Ascend Communications, Inc. (800) 621-9578	Multiband Plus	S	T	2	2	2	2	8		7	4	4	4	4		4	2	4.096M	0	B, H, P	A, B, D	2	B, C	C, U	C, P, S	✔	$5,000-$14,500/12
			U	2	2	1	1																				
	Multiband Max	S	T	4	4	4	4				32	32	32	32		32	32	8.192M	6	B, H, P	A, B, D	32	B, C	C, U	C, P, S	✔	$10,000-$50,000/12
			U	4	4	3	3																				
	Multiband LAN Service Unit	B	T	2	2	2	2	2		4	4	4	4			4	2	4.096M	0	B, H, P	A, B, D	2	B, C	C, U	C, P, S		$4,000-$9,500/12
			U	2	2	1	1																				
	Multiband Video Service Unit	B	T					3		7	2		2	2		2	2	392K	0	B, H, P	A, D	2	B, C	C, U	C, P	✔	$4,500-$9,000/12
			U																								
Cray Communications (800) 227-3134	DCP9587 Inverse Multiplexer	B	T	1							6		6	6			6	1.5M	6	B, P	A, D	6	B, C	C, U	P		$4,525-$32,500/12
			U	1																							
Gandalf Systems Corp. (609) 424-9400	Gandalf Access SDX	B	T		2		2				128							8M	10	B, P	A, B, D	9		C, U	P		$12,000-$26,500/12
			U																								
General DataComm, Inc. (203) 574-1118	Image*TMS Model 420	S	T	4	4						32	32	32	16		32	32	6.176M	20	B	A, B, D	32	C	U	P	✔	$7,875-$70,000/12
			U	4	4																						
	Image*TMS Model 414	S	T	4	4						24	24	24	12		24	24	6.176M	14	B	A, B, D	24	C	U	P	✔	$6,825-$68,000/12
			U	4	4																						
	Image*TMS Model 40	B	T	2	2						2	2	2	2		2	2	3.088M	0	B	A, B, D	2	C	U	C, P	✔	$5,775-$10,325/12
			U	2	2																						
	Image*TMS Model 4B	B	T					4			2	2	2	2		2	2	512K	0	B	A, D	2		U	C, P	✔	$7,590-$8,510/12
			U																								
	ISDN Access Manager	B	T				1									4	4	1.920M	2	B	A	4		C	C, P		$9,500-$12,900/12
			U			1	1																				
Newbridge Networks, Inc. (703) 834-3600	Transmission Access Processor 5000	S	T	4	4	4	4	16			4	4	4	4		4	4	4.096M	6	B, P	A, B, D	4	C	C	P, S	✔	$4,900-$20,000/14
			U	4	4	4	4	16																			
Premisys Communications, Inc. (415) 940-7710	IMACS/800	B	T	8		8	8	32	80		32	32	32	32	80	32	32	16M	13	B, H, P	A, B, D	12	B, C, P	C, U	P, S	✔	$8,850-$20,000/60
			U	8		8	8	32																			
Promptus Communications, Inc. (401) 683-6100	OASIS 1000	B	T	8	8	8	8	16			32	32	32	32		32	32	16M	19	B, H	A, B, D	32	B, C	C, U	P		$6,500-$60,000/12
			U	8	8	7																					
	OASIS 200	B	T	2	2	2	2	4			2	2	2	2		2	2	3M	0	B, H	A, B, D	2	B, C	C, U	P		$5,500-$10,500/12
			U	2	2	1																					
	OASIS 200L	B	T	2	2	2	2	4			2	2	2	2		2	2	3M	0	B, H	A, B, D	2	B, C	C, U	P		$7,900-$10,900/12
			U	2	2																						
Racal-Datacom, Inc. (305) 846-1601	RCP-BMM	B	T	2	2	2	2				8		8	8			8	4.096M	4	B, H	A, B, D	8	C	C, U	P		$9,000-$26,000/12
			U	2	2	1																					
	BMMini	B	T	1	1	1	1	4			2	2	2	2		2	2	2.048M	0	B, H	A, B, D	2	B, C	U	P		$6,500-$13,000/12
			U	1	1																						
Telenetics Corp. (714) 455-4000	IV-1000A2	B	T							2	1	1	1		1	1	1	128K	0	B, P	A	2	B, C		C, P		$3,875-$5,675/12
			U																								
	IV-1000A7	B	T					7		7	1	1	1		1		1	448K	0	B, P	A	7	P		C, P		$7,950-$12,900/12
			U																								
Teleos Communications, Inc. (908) 389-5700	VideoHub Model 40	S	T	4	4			8			2		2	2	2	2	2	8.192M	2	B, H, P	A, B,	2		C, U	P	✔	$7,500-$12,000/3
			U	4	4			8																			
	VideoHub Model 60	S	T	16	4			16			4		4	4	2	4	4	16M	4	B, H, P	A, B	4	P	C, U	P	✔	$9,000-$25,000/3
			U	16	4			16																			

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T-1 inverse multiplexers

Company	Product	Type and maximum number of trunk- and user-side interfaces						List price range/Warranty
		T-3	T-1	E-1	V.35	RS-449	HSSI	
Ascom Timeplex, Inc. (201) 391-1111	TX3 SuperHub	10	196	196	48	48	48	$10,000-$95,000/12 months parts and labor
Larse Corp. (408) 988-6600	Mega-T		4		1	1		$9,950-$16,500/24 months parts and labor
T3plus Networking, Inc. (408) 727-4545	BMX45	16	96		48	48	48	$15,000-$95,000/ customer-specific

HSSI = High Speed Serial Interface

SOURCE: TELECHOICE, INC., VERONA, N.J.

(continued from page 41)

provide connections between interfaces that support such user devices as video coder/decoders and ones that provide access to carrier services.

Inverse muxes with a switching matrix fall within the high end of the market. These devices switch traffic between any port on a call-by-call basis, eliminating the distinction between user- and network-side interfaces. They also support as many as 72 interfaces, can transmit 8M bit/sec or more across the bus at once, provide access to switched and dedicated bandwidth for multiple applications and are generally deployed at hub locations in user nets.

They also generally provide network access for video multipoint control units (MCU), which manage the distribution of video among sites in a multipoint videoconference.

A few high-end inverse muxes use a shared-bus architecture. These units provide many of the same features as those with a switching architecture, but they are not as flexible. For instance, users must create static links between certain ports, which ensures that data received on one port is always routed to another port.

Inverse muxes in the middle of the market typically allocate bandwidth for as many as four different applications simultaneously. Many use a shared-bus architecture, but some also support limited switching through the use of software that connects a certain port to another when user-defined parameters are met.

These inverse muxes typically support access to between one and four ISDN or other integrated access circuits and support 4M to 8M bit/sec of throughput across the bus.

At the low end of the market are shared-bus devices supporting up to 4M bit/sec of bus throughput and providing basic inverse multiplexing for a single application. For example, most low-end devices split a videoconference signal into two or more 56K or 64K bit/sec switched data circuits.

Architecture

A good way to begin evaluating an inverse mux is to look under the hood at its architecture, which dictates how and where the unit can be used and what limits are placed on the range of features it can support.

A key development in inverse muxes over the past few years has been increased use of an active switching matrix — which supports port-to-port switching — to connect interfaces. This architecture also creates the opportunity to switch calls based on dialed digits just as a private branch exchange does, a process known as dynamic switching.

A combination of port-to-port and dynamic switching provides several key advantages. For instance, such inverse muxes can act as hubs brokering between remote sites. A call coming in from a remote site via a switched service could be switched back out to another site over a dedicated trunk. At the other end of the trunk, an inverse multiplexer could strip the signal from the dedicated trunk, dial a switched digital service and send the call to yet another remote site. Thus, two low-volume remote sites can connect using a combination of short-distance dial-up and long-haul dedicated services.

Likewise, port-to-port and dynamic switching enables an inverse mux to switch a call from one local device to another local device, eliminating the need to establish a carrier network link between the two. Local switching often occurs when a video codec needs to connect to a port on a video MCU at the same site. A switching hub could read the codec's dialed number and connect it to the local MCU. A shared-bus inverse mux would have to send the call out over the carrier network, which would then switch it back to the MCU at

(continued on page 51)

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Net budgets rebound as user optimism grows for '94

ILLUSTRATION ©1993 DAVE CUTLER

CONTINUED FROM PAGE 1

1994, as only 33% of the users surveyed believe they will have to delay capital expenditures, while 48% will do so only on a few projects and 19% don't anticipate any delays.

Overall, network budgets for 1994 shouldn't shake out radically different from those this year. According to the survey, respondents plan to budget an average $3.29 million, up just 0.2% from this year's average budget of $3.28 million.

That doesn't surprise many users.

"Our budget doesn't seem to change a whole lot from year to year," says David Diaz, senior vice president of group information technology at investment house Dean Witter, Discover & Co. in New York. "The network budget is remarkably stable and predictable."

Budget banter

In the survey, *Network World* classified the respondents into three different groups — those with combined operating and capital equipment budgets, those with separate operating and capital equipment budgets and those with operating budgets only.

Users who have separate operating and capital equipment budgets indicated that they plan to bump up voice/data/video operating budgets 7.5% in 1994, to $4 million. These net managers said they allocated 59% of this year's operating budget to data, 33% to voice and 8% to video.

This is consistent with how they divided the operating budget in 1992 and how they plan to divvy it up next year.

Capital equipment budgets for that same group average $1.74 million for this year, up 6.6% from the previous year. Further, net managers are planning to boost equipment spending by 16.7% for 1994, pushing the budget to more than $2 million.

And while they plan to allocate roughly the same 27% and 63% of that budget next year for voice and data gear as they did this year, users will slightly increase the amount of money spent on video equipment from 9% to 11%.

The operating budget hike is significant, says Michael Pedersen, a manager in the Technical Services Practice at Ernst & Young, based in Vienna, Va. Since the increase doesn't show up in any major new expenditures, it seems to suggest two possibilities.

First, perhaps users are resorting to outsourcing services that get lumped under operational expenses. The other possibility, Pedersen says, is that companies may be placing greater emphasis on public carrier services such as switched T-1 facilities or frame relay to support increased video usage.

"It's very expensive to install your own video facilities," Pedersen says. "Public switched services would provide a low-cost entry point, giving network shops the chance to walk with the new technology before they run."

One anomaly in the budget recovery is those users with combined voice/data/video operating and capital equipment budgets. These users reported they plan to cut their combined budget by 10%, on average, from $3.08 million in 1993 to $2.8 million in 1994.

Pederson doesn't see that as an alarming indicator, though.

"It looks like a spike," he says. "It's not so much a budget drop as a leveling off again in 1994 after there was an immediate budget need in 1993." Combined operating and capital equipment budgets averaged $2.44 million in 1992.

Within the group of users with combined operating and capital equipment budgets, allocation of money across different areas will remain fairly consistent. Voice accounts for 33% of budget costs, data will dip slightly from 57% of the budget this year to 55% in 1994, and video will rise from 8% to 10% next year.

Overall budgets will likely rise 0.2% from $3.28 million in 1993 to $3.29 million next year.

When the total budget for next year is broken down, the percentages allocated to various items are expected to remain relatively stable (see Figure 1, this page).

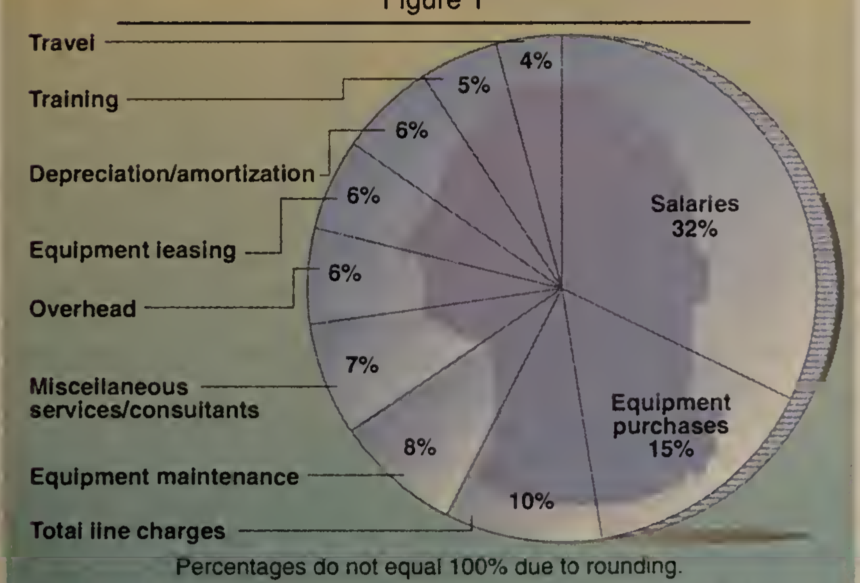
As expected, salaries eat up the largest slice of the budget (32%), with equipment purchases and total line charges accounting for 15% and 10%, respectively. In fact, distribution of the budget across the different cost areas has remained relatively consistent over the past three years.

Unavoidable spending

One area that seems destined for change in 1994 is how net managers plan to spend money allocated for capital equipment. In the study, respondents who have a separate capital equipment budget indicated that they plan to earmark $2.03 million for

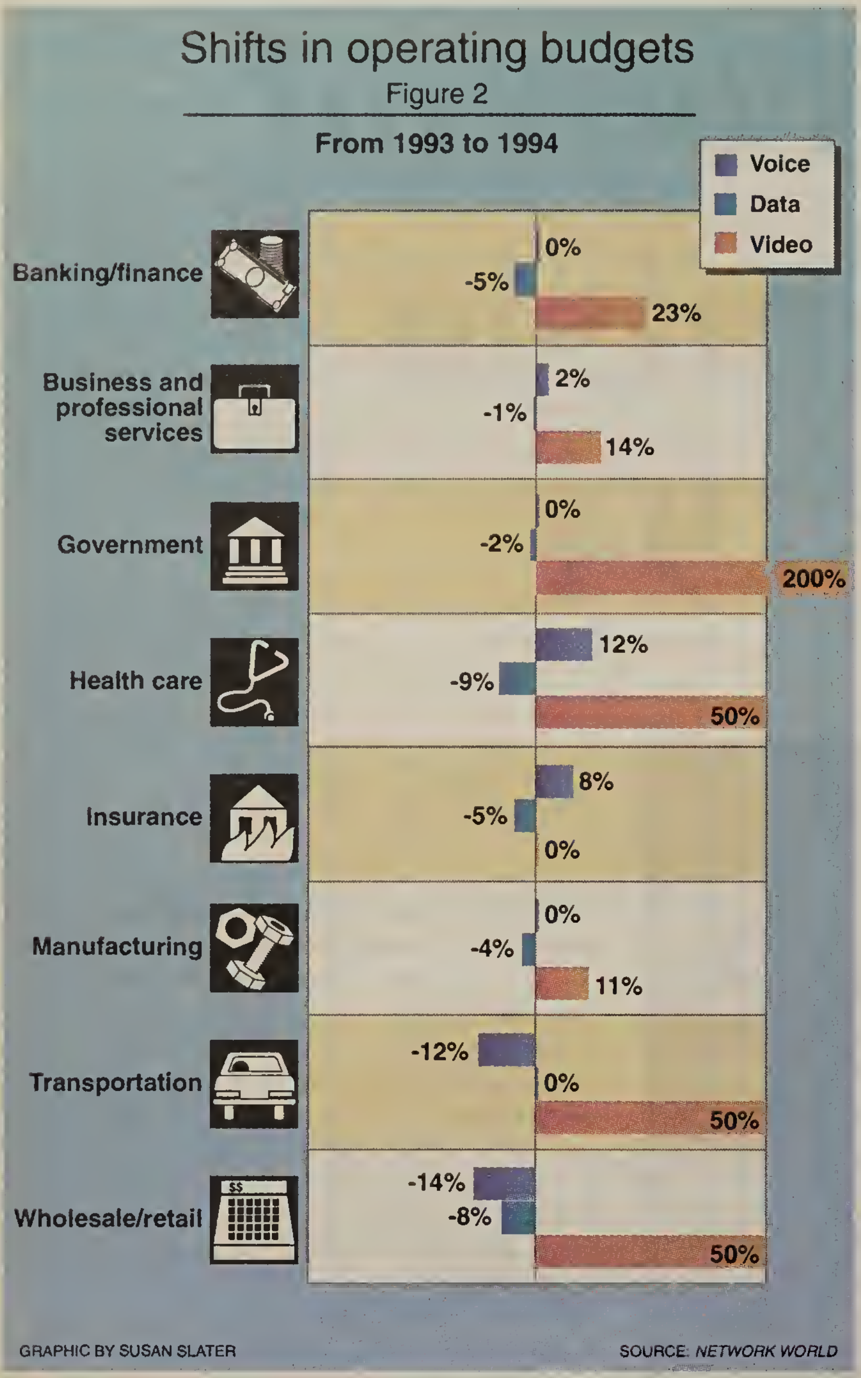
(continued on page 48)

1994 network budget breakdown
Figure 1



Percentages do not equal 100% due to rounding.

GRAPHIC BY SUSAN SLATER SOURCE: *NETWORK WORLD*



Shifts in operating budgets

Figure 2

GRAPHIC BY SUSAN SLATER

SOURCE: *NETWORK WORLD*

(continued from page 47)

the purchase of new gear in 1994.

Respondents said they expect to reserve 26% and 25% of their 1994 capital equipment budgets for local-area network equipment and LAN interconnection gear, respectively. That's essentially the same as the 52% chunk allocated to that class of products this year.

By contrast, in *Network World's* 1992 budget survey, respondents said they spent 45% of their capital budgets on LAN and LAN interconnection gear.

"I think increased spending on LANs is unavoidable," says Dean Witter's Diaz. With so much application functionality being centralized on client workstations, LANs are fast becoming the focal point for data communications, he says.

Ron West, senior manager of telecommunications and office automation at Shearman and Sterling, a New York law firm, agrees LANs are the way to go.

"In our industry, we feel that local networking can really do a lot to empower attorneys and legal secretaries," West says. "We're definitely increasing spending on LANs."

Other users, too, are convinced that rightsizing host applications to run on LANs is the best approach. "We are moving a lot of the mainframe stuff into a client/server environment," says Erwin Berliner, manager of database performance at Chevron Information Technology Co. in San Ramon, Calif. "It won't happen overnight, but we're moving in that direction."

Internetworking equipment typically accounts for a sizable budget chunk at companies looking to tie disparate LANs into an enterprise network.

"There are a couple of projects under way that involve routers," says Douglas Fields, vice president of telecommunications at United Parcel Service, Inc. in Mahwah, N.J. (*NW,* March 15, page 1).

"We continue to expand our private packet network, so packet engines are a capital item that we're acquiring. I think we generally have a pretty good balance of mainframe and LAN technology," Fields adds. "We're expanding in the client/server area quite a bit, but we're also providing centralized mainframe services at an increasing rate."

The melding of LAN internets with corporate Systems Network Architecture networks is another area that will eat into capital equipment budgets.

"One of our biggest challenges is that we have two pretty significant networks," says Chevron's Berliner. "The thing we want to do — and I think we're probably at least a couple of years away — is to merge those two."

But Berliner says whether to combine the company's SNA and Transmission Control Protocol/Internet Protocol nets would primarily be a cost issue. "There are big bucks in trying to consolidate these things," he says.

Another factor delaying such a move is that the technology isn't yet mature enough to support such a massive undertaking, Berliner says. "It's not going to happen this year. And it even would be optimistic to say it's going to happen next year," he adds.

Companies also appear determined to set aside the same 16% of capital equipment budgets for network management products in 1994 that they spent on such offerings this year.

"One area in which we are making significant investments is in network management systems," says UPS' Fields. "Since we want to deploy the best network in the world, we also want to have 100% availability."

UPS has teamed with Novell, Inc., Advanced Communications Devices, Inc. and Software Artistry, Inc. to build a network management system tailored to its client/server-based communications environment. The resulting system will neatly tie network management functions among users, the company's telecommunications support center and a network help desk.

With regard to voice-related equipment, the survey respondents allocated an average of 14% of their capital equipment budgets to such products and plan to inch that up to 15% next year.

Payback periods

One common theme net managers seem to revisit during each annual budget survey is the need for shorter payback periods for network equipment purchases. And this year is no exception.

"We are looking at a shorter horizon for return on investments — shorter payback periods," says Shearson and Sterling's West.

According to the survey, the average payback period for a major network project or equipment purchase is now 17 months. That's five months less than the 22 months cited in the 1992 budget survey.

Survey results indicate that 59% of users say payback periods have remained the same over the past two years, while 20% say they have increased and 21% reported shorter payback periods.

"I think we are far more attuned to the economy and we're focusing on what return any technological investment is going to bring to the partnership," West says. "In the past, I think we looked at that same combination, but we might have done things without that same level of economic detail."

The senior ranking member of network departments at user sites surveyed can approve purchases up to $205,000 without upper management's permission. 65% of the respondents say this amount has gone up since last year.

Network managers aren't the only company managers that hold the purse strings for communications spending. One-third of the respondents to this year's study said other departments have net budgets.

In 1993, respondents said an average of $4.1 million will be spent by other departments on network equipment and services. Users expect spending by other departments to rise in 1994 by 12.4%, to $4.6 million.

"It's difficult to know the percentage [of money] spent on mainframes now vs. PC LANs because most of the spending on the PC side is happening at individual departments," Chevron's Berliner says.

Ernst & Young's Pederson says the 12.4% expected increase for next year is "a huge jump."

Network and MIS departments are working hard to understand end-user needs better, Pedersen says. But these groups are not working fast enough to get ahead of the problems end users face, despite their efforts to centralize needs analysis and purchasing.

"End-user computing is happening in a big way," Pedersen says. "MIS is trying to be responsive to those needs, but it has a lot of catching up to do. This just shows that end users are determined to have their needs fulfilled quickly, even if it means doing it themselves."

While other departments may have their own budgets to spend on network equipment, many are also asked to cough up payment for communications expenses charged back by the network operations staff.

This year, 59% of respondents indicated that communications-related expenses are charged back to individual departments vs. 50% in the 1992 study. These respondents also said they charge departments for an average of 61% of the total communications expenses they incur.

On another front, users said, on average, the senior ranking member of their network department can approve expenditures up to $205,000 before needing approval from a higher authority. Given that, 65% of the users said that amount marks an increase from a year ago, while the other 35% claimed it decreased.

Drawing the line

Survey participants said that, on average, 63% of the budget allocated for line charges this past year went for long-distance services vs. 37% for service by local carriers. These figures are consistent with respondents' spending in 1992, and users expect this

Conducting the survey

Network World's 1993 Annual Budget Survey investigates budget trends of networking technology's leading users.

This year's survey, which was conducted in April, is based on 276 responses from a randomly selected sample of 2,000 network managers who subscribe to *NW*. This yielded a response rate of 13.8%.

To gain a statistically representative sampling of network users, we selected company sites across a range of industries and regions.

Only those managers at user organizations who specified, recommended or approved $500,000 or more for networking equipment and services during the past 12 months were invited to participate.

In addition to direct questions about budgets, the survey asked about capital expenditures, organizational structure, and to what extent the economy is delaying projects or making managers reduce the time required for a project's return on investment.

Survey respondents answered questions posed to them from a disk-based questionnaire. As respondents entered their answers, the information was stored on a 3½-in. floppy disk. A postage-paid diskette reply envelope was provided with each questionnaire.

Under the direction of *NW* Research Director Ann MacKay, answers from the returned disks were compiled into one database, where the data was then averaged and cross-tabulated by region, vertical industry and the size of the company's network operating budget.

— *Charles Bruno*

spending split to remain unchanged in 1994.

When asked what types of new network technologies they would explore seriously in 1994, net managers repeatedly named such high-speed data services as Asynchronous Transfer Mode (ATM) and frame relay.

Dean Witter's Diaz, who sees ATM as a promising data service, is experimenting with frame relay, as well. He says the benefit of frame relay is that it lets you start with small-bandwidth increments and ramp up as needs grow. "That makes it easier to do capacity planning," Diaz says.

Destined to grow

With the Clinton administration making health care reform a top national issue, many players in the insurance and health care markets may be forced to expand network operations to accommodate changes.

According to Ward Keever, senior vice president of information services at the Medical Center of Delaware in Wilmington, initiatives launched by President Clinton could well force the medical community to invest heavily in net technology.

"As we begin to move from thinking of ourselves as an acute-care hospital to a health care delivery system that includes primary satellites and remote clinics, the network needs to be expanded to incorporate these facilities," Keever says.

Health care organizations such as the Medical Center of Delaware will be faced with the task of providing a network infrastructure for physicians, home health organizations and other types of providers.

"The network becomes the key for taking time and paper out of the communications among all the stakeholders," Keever says. "That's where the efficiencies will come from to lower health care costs."

Looking ahead

For some users, such as the Medical Center of Delaware, network expansion appears inevitable. Many net managers will be required to undertake new projects yet make do with existing budget levels. For others, no new net growth is on the horizon.

Overall, though, users appear more confident about the economy and feel they'll be able to get net projects rolling again soon.

As far as planning for 1994, it appears users will increase operating and capital budgets marginally yet spread the increases evenly across different areas.

Video seems to be one sector in which users will divert additional financial resources, while the trend toward LAN equipment and LAN interconnection products will remain unchanged as users continue on their path to distributed systems.

Perhaps users' feelings about budgeting for 1994 can best be described by the words of a network manager at a major electronics manufacturer in the South who requested anonymity.

"I believe the economy is getting better," he says. "But I don't think the improvement will cause a significant amount of money to be allocated to the network budget. We're being pragmatic about our plans for next year. We've been that way for the past couple of years, and it's worked." ◘

Bruno is the features editor at Network World. *He may be reached via the Internet at cbruno@world.std.com, via MCI Mail at 390-4868 or via the publication's own Bulletin Board System.*

Joanne Cummings, a freelance journalist based in Marlborough, Mass., contributed to this report.

Dipping into the pool

Network World drew upon a diverse pool of readers to participate in the 1993 Annual Budget Survey. Of the 276 participants, 35.5% hailed from manufacturing industries, 17.8% from banking and finance companies, and 13.4% from insurance firms. Other industries each accounted for less than 10% of the survey base.

This mix contrasts sharply with the 1992 survey, in which government agencies accounted for 26.9% of the respondents, manufacturers made up 14.4% and educational institutions comprised 10.5%.

The average annual revenue of this year's participants is $3.8 billion, compared to $3.4 billion last year. Banking and financial institutions in this year's survey offer healthy average assets of $11.1 billion, while in last year's survey, the same group averaged $5.1 billion in assets.

This year's survey shows that more respondents have budget control over multisite networks and have communications budget responsibility for three locations in the U.S. and two abroad.

About 18% of the respondents indicated that their budgets are used across all company locations worldwide, up from 13% in the 1992 study.

"This suggests companies may be trying to gain an organizationwide needs assessment by centralizing the budget process," says Michael Pedersen, manager at Ernst & Young, a Vienna, Va., consultancy. "Companies may be trying to gain a higher level enterprise view of where the money is being spent and where it should be spent, and focusing on how to fulfill user requirements."

In addition, 33% said their budgets are used at one operating unit of an organization.

The survey also found that 51% of the respondents have a separate budget for capital equipment, 43% have an operating budget that includes all equipment, and 4% only have an operating budget that does not include equipment.

— Charles Bruno

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New kid grows up

continued from page 46

that site (see graphic, page 55).

There's another growing use of port-to-port and dynamic switching supported by Ascend Communications, Inc. and Teleos Communications, Inc. This feature enables non-ISDN devices to share an ISDN Primary Rate Interface (PRI) with ISDN terminal equipment.

Ascend's Multiband Plus and Multiband LAN Service Unit (LSU), which is designed to support remote Ethernet interconnection, as well as all Teleos units, can take a T-1 feed from a PBX and stuff individual 64K bit/sec channels into ISDN PRI B channels on a call-by-call basis, a process known as trunk-to-trunk switching, or ISDN PRI-to-T-1 conversion.

Also, these units can shoehorn ISDN B channel traffic from ISDN terminal equipment into B channels on that ISDN PRI. Ascend will support this feature on its Multiband Max by the end of this month.

Teleos was the first vendor to implement switching in its inverse multiplexers. Ascend just recently announced support for limited trunk-to-trunk switching in its Multiband Max and Multiband Plus products, which also now offer some switching features based on dialed digit recognition.

For instance, the Multiband Max or Multiband Plus will automatically provide access to a specific carrier or service based on the number dialed.

Ascend's and Teleos' switch-based inverse muxes allocate network bandwidth in a completely permissive mode with each application having equal access to bandwidth on a first-come, first-served basis.

In other words, the application requests a certain amount of bandwidth and the inverse mux checks its inventory of network trunks, assigning the first available and appropriate circuits to that application.

Teleos devices can also set aside bandwidth to support a scheduled call.

For instance, in order to support a 384K bit/sec videoconference at 3 p.m., the device can be instructed to grab inactive 64K bit/sec circuits at 2:45 p.m. If circuits are unavailable, the device will proceed to monitor circuits in use and grab them as soon as

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T-1 I-muxes emerge

An emerging class of inverse multiplexers promises to provide an economical alternative to high-priced T-3 services.

Products in this new genre, known as T-1 inverse muxes, include T-1 or T-3 multiplexers with T-1 inverse multiplexing modules or stand-alone units (see graphic, page 46). However they are packaged, T-1 inverse muxes differ from typical inverse muxes in several ways.

Most notably, these new products split high-speed traffic coming from user devices into T-1 increments. For example, 4.6M bit/sec traffic generated by a file-transfer application is broken into three T-1 data streams that are routed over separate point-to-point T-1 leased circuits.

In contrast, typical inverse muxes divide high-speed traffic from user devices into increments of 56K, 64K or 384K bit/sec and distribute it across multiple switched data circuits operating at up to T-1/E-1 speeds.

Larse Corp. supplies a stand-alone T-1 inverse mux, called Mega-T, which can spread traffic over as many as four T-1 circuits.

Increased popularity

T-1 inverse multiplexing has been added to Ascom Timeplex, Inc.'s TX3 SuperHub as well as T3plus Networking, Inc.'s BMX45, both of which are T-3 multiplexers.

Because both of these products support T-3 interfaces, the T-1 channels created by inverse multiplexing can be bundled with other traffic over a T-3 circuit or they can be routed over separate T-1 trunks.

Users of T-1 inverse muxes read like a who's who list of high-speed networking. Microsoft Corp. of Redmond, Wash., has deployed a network with Ascom Timeplex TX3 SuperHubs, providing, what is in effect, a fractional T-3 interconnection between local-area networks in different cities.

In addition, Northrup Corp. is currently using T3plus' BMX45s for high-speed transfer of computer-aided design and manufacturing files across the wide area.

T-1 inverse muxes also sport high-speed data terminal equipment interfaces such as the High Speed Serial Interface (HSSI). Typical inverse muxes do not support HSSI.

Another difference is that T-1 inverse multiplexers do not support any standard protocol for interoperation, such as the emerging standard being developed by the Bandwidth on Demand Interoperability Group that is supported by many regular inverse mux makers.

— Daniel Briere and Christopher Finn

Users of T-1 inverse multiplexing read like a who's who list.

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they are free.

On the other side of the coin is the simpler — and less expensive — shared-bus architecture, which requires the use of set network-side and user-side ports. For the most part, inverse muxes with a shared bus cannot allocate bandwidth on a call-by-call basis. Instead, relatively static connections are established with a control panel or via software.

For instance, a user-side port accepting a 384K bit/sec videoconference feed is instructed to pass traffic to network interfaces, thereby providing access to six specific switched 64K bit/sec circuits.

Only AT&T provides switched 384K bit/sec service. AT&T prices this service at a lower rate than the equivalent amount of bandwidth achieved via inverse multiplexed 56K or 64K bit/sec channels. Most video equipment is based on a 384K bit/sec channel.

However, with the addition of software, shared-bus architected devices can be instructed to perform some limited switching functions, such as changing the connections between user- and network-side interfaces on a time-of-day basis.

Shared-bus devices are usually deployed behind a PBX or another static access device, such as a channel bank or T-1 mux.

Examples of products based on a shared-bus architecture include Ascend's Multiband Plus, Racal-Datacom, Inc.'s RCP-BMM and Tylink Corp.'s SNS 4000.

After evaluating architectures, the next step is to take a look at the carrier services a product can access and then at the type and number of interfaces provided.

While inverse muxes were first designed to access only switched digital services, they have evolved into hybrid net hubs, providing access to all transmission services entering a customer's premise, such as voice services, private lines and packet network services.

Inverse muxes include interfaces providing access to T-1, T-1 ISDN PRI, E-1, E-1 ISDN PRI,

(continued on page 55)

I-mux makers BONDING

Nine vendors recently demonstrated interoperability among disparate inverse multiplexers using an emerging standard developed by the Bandwidth on Demand Interoperability Group (BONDING).

In the test, 3Net, Ltd., Adtran, Inc., Ascend Communications, Inc., Newbridge Networks, Inc., Promptus Communications, Inc., Telco Systems, Inc., Teleos Communications, Inc., Tylink Corp. and UDS Motorola established multiple switched 64K bit/sec connections between one another's products using BONDING Mode 1.

3Net's product is sold in the U.K., while Telco Systems and UDS Motorola support inverse multiplexing as part of other net access products.

The BONDING specification is under consideration for standardization by ANSI's TR 41.1 subcommittee and will likely be approved this summer. It is also being considered by the Consultative Committee on International Telephony and Telegraphy for formal standardization.

The BONDING specification outlines four modes of inverse multiplexing operation:

- **Mode 0.** This is a special mode that performs only one function. It enables inverse multiplexers to receive two 56K bit/sec data streams from a video coder/decoder and establish dual 56K bit/sec calls to support a videoconference.
- **Mode 1.** This mode enables inverse muxes to spread a high-speed data stream over multiple switched 56K or 64K bit/sec circuits but does not provide error checking.

Inverse multiplexers operating in this mode have no way of knowing if one of the circuits in a multiple circuit call has failed. Thus, the end node must detect when it is not receiving the full amount of data transmitted and request more bandwidth.

- **Mode 2.** This mode adds error checking to each 56K or 64K bit/sec circuit. It also steals 1.6% of bandwidth from each circuit to enable inverse multiplexers to pass information that helps detect circuit failures and reestablish links.

Because this mode steals bandwidth from each circuit, it cannot be used to support Px64 videoconferencing or as a substitute for a T-1 channel, both of which require the use of the full circuit bandwidth. This mode lets net managers manage remote inverse multiplexers.

- **Mode 3.** This mode uses out-of-band channels for error checking. Typically, this subchannel is provided over a separate dial-up circuit, but, in some cases, it is created from unused bandwidth on a circuit.

When establishing calls, inverse multiplexers first check whether they can interoperate using a proprietary vendor-to-vendor protocol. If they cannot, they turn to the BONDING protocol.

Today, all major inverse mux vendors claim to support BONDING. Still, some vendors contend that technology has advanced faster than the BONDING protocol and that proprietary protocols now provide better performance and more flexibility.

— Daniel Briere and Christopher Finn

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Circle Reader Service #10

(continued from page 53)

ISDN Basic Rate Interface (BRI) and two- and four-wire 56K bit/sec circuits. Most also support fractional T-1 services, such as switched T-1, switched 384K bit/sec, and switched 56K or 64K bit/sec services, but there are some exceptions. Ascend's Multiband Video Service Unit (VSU) and Adtran, Inc.'s ISDN Service Unit only support switched 56K or 64K bit/sec services. Cray Communications' DCP9587 Inverse Multiplexer only supports fractional T-1 and switched 56K or 64K bit/sec.

General DataComm, Inc.'s Image*TMS Model 4B supports switched 56K or 64K bit/sec. Other products that don't support the full list of services include Racal-Datacom's BMMini, which does not support switched T-1; Telenetics Corp.'s IV-1000A2, which only supports switched 56K or 64K bit/sec, and its IV-1000A7, which supports switched 384K bit/sec and switched 56K or 64K bit/sec.

Users might also want to consider whether a unit will support the upcoming multirate ISDN services. A similar service, GLOBAND, is now offered by an alliance of European carriers. MCI Communications Corp. is the only U.S. carrier that has announced plans to provide GLOBAND services.

Inverse mux vendors that support both multirate and GLOBAND are: Ascend, Premisis Communications, Inc., Promptus Communications, Inc. and Racal-Datacom. Vendors supporting only multirate are: General DataComm, Teleos and Tylink. Newbridge Networks, Inc.'s Transmission Access Processor (TAP) 5000 supports only GLOBAND.

Inverse muxes are also a good match with carrier integrated access options, which allow for multiple services on a single T-1. A user can mix switched data traffic generated by inverse multiplexing on the same T-1 carrying virtual network, private-line and 800-service traffic.

Interface support

The actual number of physical interfaces an inverse multiplexer can support is dependent on the number of slots it has and its bus throughput. Users can mix and match any number of interfaces in available slots, but the bus throughput will dictate how many of these interfaces can be active at any time.

Users looking for an inverse mux that can handle numerous connections should consider devices that provide high levels of throughput and a switching matrix such as Teleos' NetworkHub Model 200, which supports an 18M bit/sec bus throughput and as many as 18 T-1 network trunks or 72 ISDN BRIs.

Some vendors cannot simultaneously mix and match certain interfaces. For instance, many users have a PRI to one carrier, a T-1 to another and a couple of BRIs to a third carrier.

While most units can simultaneously support PRIs and T-1s from different carriers, only a few models from Teleos can simultaneously support a PRI and a BRI. There are a few low-end devices that provide only a single BRI, like Adtran's ISDN Service Unit.

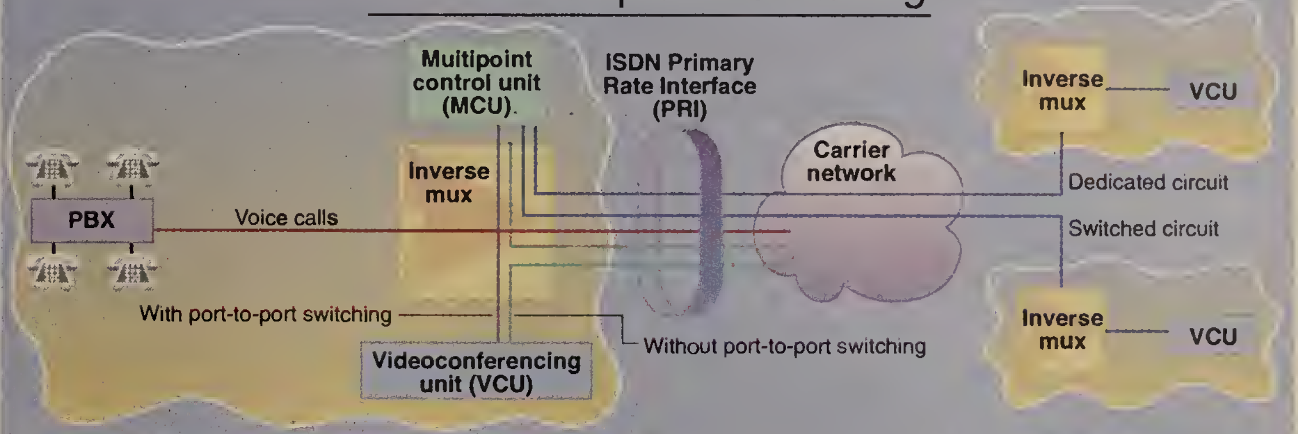
Analyzing user-side interfaces is a straightforward task. Every inverse mux listed in the Buyer's Guide chart provides V.35, RS-449/RS-422 and RS-366 interfaces. In addition, every unit listed supports static drop-and-insert capabilities, which enables the inverse multiplexer to, for example, set aside the first 10 channels of a T-1 line for a PBX and leave the rest to support inverse multiplexing applications. Vendors providing inverse muxes with more than 30 user-side interfaces include Ascend, General DataComm, Premisys, Promptus and Teleos.

Ascend is the only vendor currently supporting a LAN interface. The firm provides an Ethernet interface as an option on all models, including its Multiband LSU.

While users should take a look at the interfaces currently supported on a product, many inverse muxes, including Ascend's Multiband Plus and Promptus' OASIS 200, have the ability to add

(continued on page 57)

Inverse multiplexer switching


Multipoint control unit (MCU)
ISDN Primary Rate Interface (PRI)
Inverse mux
VCU
Carrier network
Inverse mux
PBX
Voice calls
Dedicated circuit
Switched circuit
With port-to-port switching
Inverse mux
VCU
Videoconferencing unit (VCU)
Without port-to-port switching

Port-to-port switching establishes a link between a VCU and MCU at the same site. Remote VCUs use inverse multiplexed carrier circuits to connect to the MCU, which distributes video among sites. Without port-to-port switching, a local VCU uses a carrier circuit to connect to the MCU. Also, some inverse muxes can insert traffic from a non-ISDN PBX into B channels on the same ISDN PRI carrying video traffic.

GRAPHIC BY SUSAN SLATER

SOURCE: TELECHOICE, INC., VERONA, N.J.

THEY CAN TRY TO COPY OUR PRODUCTS, BUT THEY'LL NEVER DUPLICATE OUR RESULTS.

When you build servers that lead the industry in price and performance, make your network easier to manage, and come with a free three-year, on-site* warranty, it's not surprising that other computer companies would try to duplicate them. It's also not surprising that they can't. For more information on Compaq products, just call us at 1-800-345-1518.

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Hardware comes and goes. Fiber is forever.

A quick look back makes it crystal clear: today's hardware is tomorrow's museum artifact.

But there's one thing that better not be dated in a few years: the optical fiber that links your network. You can't afford to tear down walls every time there's a technology breakthrough.

That's why it's not only wise to specify the right fiber throughout your premises network; it's *crucial.* Only Corning® fiber, for example, gives you specified values for chromatic dispersion—a key consideration in planning future system upgrades. And Corning offers ±1.0 micron tolerance in cladding outer diameter—a crucial measure of a fiber's consistency, contributing to easier splicing and connectorizing. Specifications like these can have a major impact on whether a fiber will meet your future needs.

We offer a variety of literature aimed at helping you maximize the performance of the fiber in your network. Call **800-525-2524, ext. 310** to request a free copy of any of the following:

- *Understanding Fiber Optics*
- *How Fiber Characteristics Impact Network Performance*
- *How to Spec the Right Optical Fiber*
- *Multimode fiber brochure*
- *Fiber case histories*
- *List of cable suppliers that offer Corning fiber.*

Specify Corning. Fiber you can count on.

CORNING

Circle Reader Service #9

(continued from page 55)

or delete interfaces via software downloads, for instance.

Most products also provide expansion slots into which interface cards can be plugged. General DataComm's Image* TMS 420 has 20 expansion slots, more than any other product listed. Promptus and Teleos both offer units with almost as many.

Some users might also want to consider the newly developed port extension units offered by Ascend and Teleos. These units come in pairs. One plugs into a user-side interface and, for example, converts a coaxial cable signal to run over unshielded twisted-pair cabling. A unit at the other end converts the signal to run over a short coaxial link to the end-user device. This enables users to exceed coaxial cable distance limitations.

Videoconferencing

When it comes to putting inverse muxes to use, videoconferencing is the most common application. "Inverse multiplexing with video, that's a slam dunk, you gotta have it," says Jay Duncanson, a founder of Ascend.

To support videoconferencing, an inverse mux has to provide V.35 and RS-366 interfaces, which all of those in the chart do. Codecs, MCUs and most other video equipment plug into those two interfaces. The inverse mux should also be able to provide a 384K bit/sec channel, either via multiple 56K or 64K bit/sec circuits or a switched or dedicated 384K bit/sec circuit.

Additionally, users may want to be sure that their inverse mux supports the CCITT's emerging H.221 videoconferencing standard for video codecs. H.221 enables a video codec to perform its own inverse multiplexing and communicate with another H.221 video codec. H.221 support on an inverse mux enables a non-H.221 device to communicate through the inverse mux to an H.221 device.

International inverse multiplexer availability

Vendor	Australia	Canada	France	Germany	Hong Kong	Italy	Japan	Mexico	Spain	Switzerland	Taiwan	U.K.
Adtran, Inc.	✓	✓										✓
Ascend Communications, Inc.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cray Communications		(1)					✓	✓			✓	✓
Gandalf Systems Corp.		✓		✓						✓		✓
General DataComm, Inc.							✓					✓
Newbridge Networks, Inc.	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Premisys Communications, Inc.		✓		✓	✓	✓		✓			✓	
Promptus Communications, Inc.		✓		✓	✓		✓					✓
Racal-Datacom, Inc.		✓										
Telenetics Corp.		✓	✓	✓		✓		✓	✓	✓		
Teleos Communications, Inc.		(1)					(2)			(1)		(2)
Tylink Corp.		✓					✓	✓			✓	

✓ = At least one product certified and available for sale in the country.
(1) = At least one product certified, but none available for sale in the country.
(2) = All products certified, but only a few available for sale in the country.

SOURCE: TELECHOICE, INC., VERONA, N.J.

Ascend, Promptus and Teleos all offer inverse muxes that are packaged for video. Ascend's Mutliband VSU provides inverse multiplexing and access to video applications at a cost of little more than the CSUs that would otherwise be required. The Multiband VSU has only video interfaces, V.35 and RS-366, and has the ability for local switching among video codecs through an MCU.

Promptus offers similar functionality with its OASIS 200. Both Ascend and Promptus offer large-scale video hubbing devices, which are designed to provide support for multipoint video.

Teleos offers three VideoHub switching hubs that range from the lower end multiapplication VideoHub Model 40, all the way to the feature-packed VideoHub 200, which can provide consolidated access to multiple MCUs and bridging for as many as 34 video calls.

"We are doing mostly interenterprise video requiring 256K bit/sec and above, and that requires inverse muxes and standards," says Ken Kenworthy, president of Visual Communications, Inc., an Atlanta-based company that is setting up a network to provide interactive multipoint video seminars using Tylink's SNS 4000.

Device management

Inverse mux vendors offer a range of management options, including front-panel displays and controls, hand-held control units and applications accessed from external terminals or personal computers. Vendors are also increasingly providing Simple Network Management Protocol support.

Larger hub-type products are usually managed via a local or remote PC. User interfaces to the management system vary from a Digital Equipment Corp. VT-100 ASCII terminal to graphical user interfaces based on Microsoft Corp.'s Windows 3.1. For instance, Teleos offers a Windows interface, while Ascend and Promptus offer VT-100 screens.

Increasingly, smaller units are being outfitted with front-panel keypads and LCD displays. Until now, most inverse mux vendors required a PC or attached terminal to handle management chores. Other units, such as Ascend's, are coming out with hand-held controllers, palmtop units that are linked via a cable to the inverse mux management port and act essentially as a hand-held VT-100 terminal. All inverse muxes support some form of notification of user and carrier network alarms, self-testing and password security.

Every inverse multiplexer includes an automatic circuit restoral feature that enables it to monitor a switched circuit and dial up additional circuits when needed. For instance, if one of six switched circuits supporting a 384K bit/sec video call fails, the inverse mux dials up a new circuit without terminating the videoconference. Until the new circuit is up, the inverse mux attempts to stuff the traffic that would have gone over the failed circuit onto the remaining five, thus degrading overall videoconference performance. The new circuit could appear within seconds, making the

(continued on page 59)

Readers give inverse muxes a mixed review

The few readers who reported using inverse multiplexers are happy with them, according to the most recent *Network World*/Focus Data, Inc. survey. But a substantial portion of the readers surveyed either don't know what inverse muxes are or have no use for them.

Only 21 of the 130 readers surveyed said they have inverse multiplexers while only four others are planning a purchase. Readers who currently have inverse multiplexers are generally satisfied with the products' performance and features. "They're right on base," one reader says.

"We installed them three months ago," another reader says, "and they are working just fine. They're doing exactly what we wanted, although we haven't pushed them to the limit yet."

Three items topped these readers' lists of the criteria that are most important in the purchasing process: reliability, conformance to standards and service/support. Readers' answers indicate they believe inverse mux vendors are meeting these needs.

While many users are quite satisfied with their inverse muxes, there are some common areas in which users said vendors could do a better job. The most often-cited area is education. Other readers said they wish their inverse muxes could support access to such new or emerging services as Asynchronous Transfer Mode and frame relay.

Readers not considering an inverse multiplexer purchase cited two primary reasons: 54% said they do not have a business need or application that would justify the expense, and 29% said they are simply unfamiliar with the product category.

"We have no applications for inverse multiplexers. Instead, we use [regular] multiplexers for access [to carrier services] and as switches," one reader says.

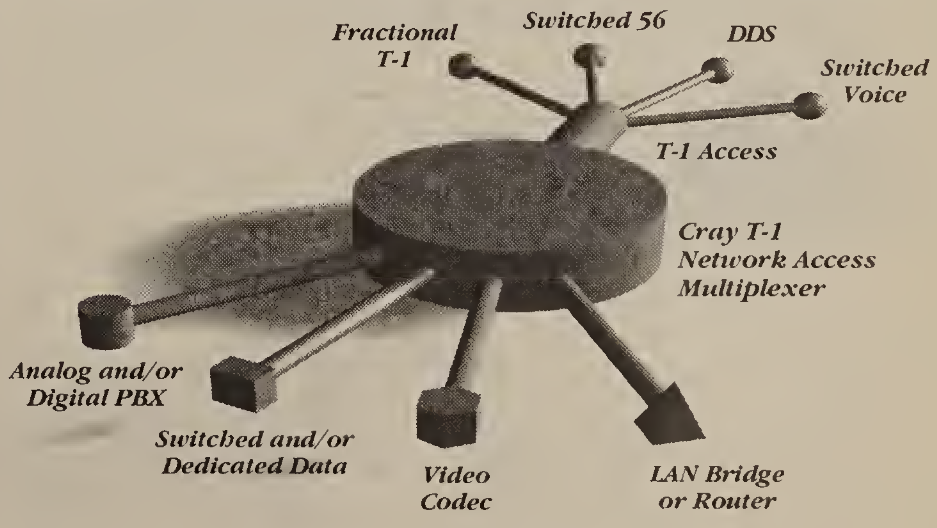
"I know what multiplexers are," another reader says, "but I don't know what inverse multiplexers are."

— Kyle Nitzsche

Focus Data, Inc., a Framingham, Mass.-based market research firm, gathers data from end users to determine network and information systems usage, trends, needs and satisfaction levels. For more information, call Mona Dabbon at (508) 626-2556.

CRAYISM NO. 3

WHY DO YOU NEED SEPARATE NETWORKS FOR VOICE AND DATA?


Fractional T-1
Switched 56
DDS
Switched Voice
T-1 Access
Cray T-1 Network Access Multiplexer
Analog and/or Digital PBX
Switched and/or Dedicated Data
Video Codec
LAN Bridge or Router

YOU DON'T - WITH A CRAY MULTIPLEXER.

The Cray DCP9506 T-1 Network Access Multiplexer can combine voice and data inputs over a single T-1 local loop and access the most cost-effective, carrier-provided service for each. There's even an inverse multiplexer option to provide bandwidth-on-demand. The DCP9506 combines the versatility of an intelligent multiplexer with the economies of a simple channel bank.

For more information on Cray Integrated Access Products and our worldwide support team, call 800-227-3134 (or 301-317-7156) or write Cray Communications, 9020 Junction Drive, Annapolis Junction, Maryland 20701.

Cray Communications

Circle Reader Service #15

Here's a complete list of companies that can offer you all three fast packet services.

1. Bell Atlantic
2.
3.
4.
5.

Your search for efficient, cost-effective, reliable data communications solutions is finally over. Bell Atlantic* is the first and only vendor in the region to offer three state-of-the-art fast packet services: SMDS, Frame Relay, and FDDI Network Services. Because we offer the widest selection of fast packet services, we can customize the perfect solution for your business. For more information, please call.

1-800-422-0455

Bell Atlantic
We're More Than Just Talk.®

* These services are provided by the Bell Atlantic telephone companies, including Bell of Pennsylvania, Diamond State Telephone, the C&P Telephone companies and New Jersey Bell. Services are subject to availability in each jurisdiction.

(continued from page 57)

degradation barely noticeable in most cases.

On the other hand, the automatic restoral feature of inverse muxes supporting applications that use a mix of dedicated and switched bandwidth can neither monitor the dedicated circuit for degradation or loss nor dial up additional switched circuits as needed. Inverse muxes that monitor dedicated and switched services include Cray's DCP9587 Inverse Multiplexer, Newbridge's TAP 5000, Racal-Datacom's RCP-BMM and Tylink's SNS 4000.

Promptus units can also sense dedicated line utilization or failure. Teleos does not support dedicated line monitoring in any of its products.

Several vendors offer SNMP agent software that enables users of most SNMP-based workstations to monitor and control their inverse muxes. Ascend offers an SNMP-based management application for most of its products, though not the Multiband VSU. Newbridge offers SNMP for its TAP 5000, and Tylink offers it for its SNS 4000. Teleos and Promptus both plan to offer support for SNMP by the end of this year.

Support/pricing

As with any other piece of customer premise equipment, service and support is a factor in selecting an inverse mux. However, assessing a vendor's support capabilities can be tricky.

Most offer extended warranties and optional levels of support for an additional cost. But vendors' responsiveness to support requests varies. Interviewing existing customers is one of the best ways to assess this factor. Vendors offering products with dozens of interfaces should be willing to participate in the design phase of the network and provide implementation support.

For inverse muxes being used overseas, key issues include how quickly a vendor can get a technical support person to the user's site and how capable that person is. Some vendors, such as Newbridge and Racal-Datacom, have in-place worldwide service networks, while others must rely on regional or third-party support.

Customers planning to use inverse muxes in other countries also need to look at the steps vendors have taken to ensure that their device will interoperate with that country's public network, as well as whether it has been certified by the government and is available for sale in various countries.

For instance, only Tylink has certified its equipment for use in Korea, but that is one of only five countries the firm supports. Ascend has products certified and available for sale in most countries, while Teleos currently only has products available in Japan and the U.K. and certified in two others. But Teleos expects to have products certified and available in 14 other countries by early next year (see graphic, page 57).

Many users find inverse muxes to be an expensive piece of network access equipment. A fully featured switching hub can cost upward of $70,000. Some can be as low as $2,000 or $3,000.

But the price of inverse muxes can be insignificant in comparison to the annual cost of carrier services. When the savings resulting from using switched instead of dedicated bandwidth are factored in — as well as cutting travel expenses via videoconferencing — inverse muxes actually save many users money.

A future?

The most immediate change in this market will be increased network management support through SNMP. Also, users can expect mainstream T-1 muxes and video codecs to support integral inverse mux functions. PBX vendors are making a play for this market, too, but face an uphill battle getting data communications managers to route data applications through a PBX.

However, the need for devices to manage the growing number of network services is sure to increase, and the current crop of inverse muxes is likely to evolve and grow with the emergence of switched digital services and hybrid switched and dedicated networks.

Variable bandwidth capabilities from the carriers, such as those provided by ISDN multirate services, may also compete with inverse muxes. But users will still need to terminate these types of variable bandwidth data streams, and that requires many of the features inherent in most inverse muxes. ◘

Briere is president of and Finn is a senior analyst with TeleChoice, Inc., a Verona, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. They can be reached at (201) 239-0700 or on MCI Mail at DBRIERE (445-4690).

The Short List:

Inverse multiplexers

1993 NETWORK WORLD SHORT LIST

The Short List highlights products Network World *recommends you examine during the selection process for inverse multiplexers.*

Inverse multiplexer hubs

Products in this category were judged on their ability to connect interfaces on a call-by-call basis, support for the broadest array of interfaces, applications and carrier services, and demonstrated support for the Bandwidth on Demand Interoperability Group (BONDING) standard.

- **Ascend Communications, Inc.'s Multiband Max.** This inverse mux supports as many as 32 simultaneous applications. Recent software upgrades enable the product to perform Integrated Services Digital Network Primary Rate Interface (PRI)-to-T-1 conversion, which enables a non-ISDN private branch exchange to use a PRI for faster call setup without an expensive ISDN conversion. It also provides a multicarrier gateway for selecting network services on a call-by-call basis, features every popular network management user interface and supports the Simple Network Management Protocol. Multiband Max will soon offer call detail recording and provide the port-to-port switching necessary for on-site videoconferencing units. It supports the BONDING standard.
- **Teleos Communications, Inc.'s NetworkHub Model 200.** Teleos' NetworkHub Model 200 is the only inverse mux that can connect all its ports through an active switching matrix and software. It provides support for the most simultaneous applications: 34. The NetworkHub 200 simultaneously provides access to multiple carrier services on a call-by-call basis and has the ability to reserve bandwidth for priority or scheduled applications via a Microsoft Corp. Windows 3.1-based management system. Although other vendors' units are now approaching the Model 200 in overall capacity, it is still the most flexible hub on the market. It supports the BONDING standard.

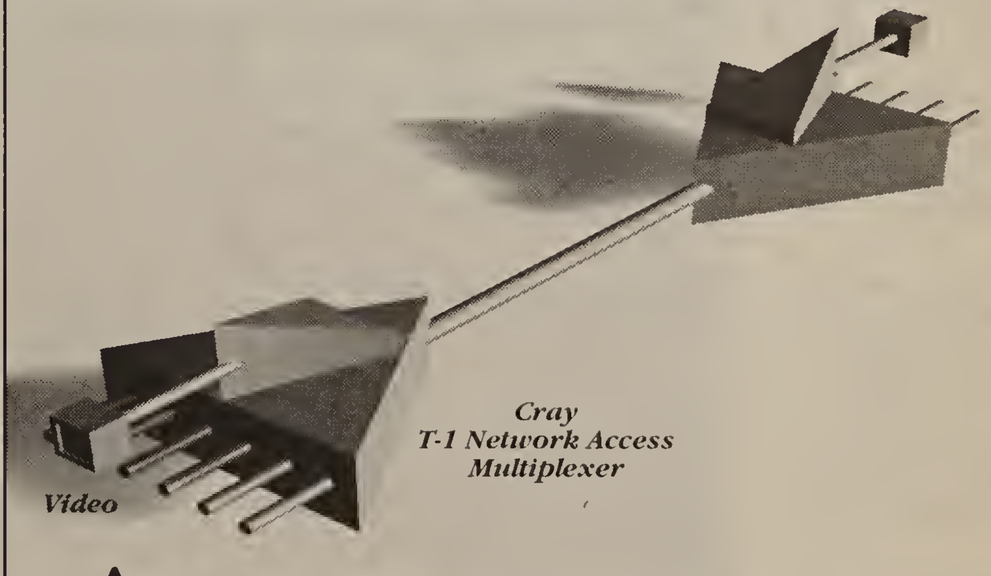
Multiapplication inverse muxes

These devices provide flexible network access for one to four simultaneous applications. Products were judged based on their support for multiple applications and interfaces, demonstrated support for BONDING, dynamic allocation of bandwidth to a downstream PBX, price and the breadth of international certification.

- **Ascend's Multiband Plus.** Multiband Plus can support four dissimilar applications, augment dedicated bandwidth with switched services and provide call-by-call network routing. Recently, Ascend added an ISDN PRI-to-T-1 conversion capability. The device has a strong combination of features, price and international availability. It also supports the switched 56K bit/sec carrier access interface, which is only offered by one other vendor, as well as SNMP and BONDING.
- **Teleos' NetworkHub Model 60 and VideoHub Model 60.** The Teleos NetworkHub Model 60 and VideoHub Model 60 have nearly all the features of the Model 200s but in a smaller chassis and at a lower price. Both Model 60 units simultaneously support as many as 16 user applications, with every application having access to bandwidth on a call-by-call basis. The Model 60s support a range of interfaces via interchangeable cards. All of the Teleos inverse muxes support BONDING interoperability and employ a switching hub architecture and software.

CRAYISM NO. 4

HOW TO GET BANDWIDTH-ON-DEMAND OUT OF YOUR CRAY T-1 MUX.



ADD AN INTEGRAL INVERSE MUX.

Dedicated bandwidth is too costly for periodic, high-bandwidth applications like videoconferencing. Cray's inverse multiplexer adds the flexibility to support video, LAN internetworking and back-up applications on a "pay-as-you-go" basis. All through the same T-1 line that's already carrying your voice and data traffic!

For more information on Cray Integrated Access Products and our worldwide support team, call 800-227-3134 (or 301-317-7156) or write Cray Communications, 9020 Junction Drive, Annapolis Junction, Maryland 20701.

Cray Communications

Inverse multiplexers (I-mux) (continued from page 42)

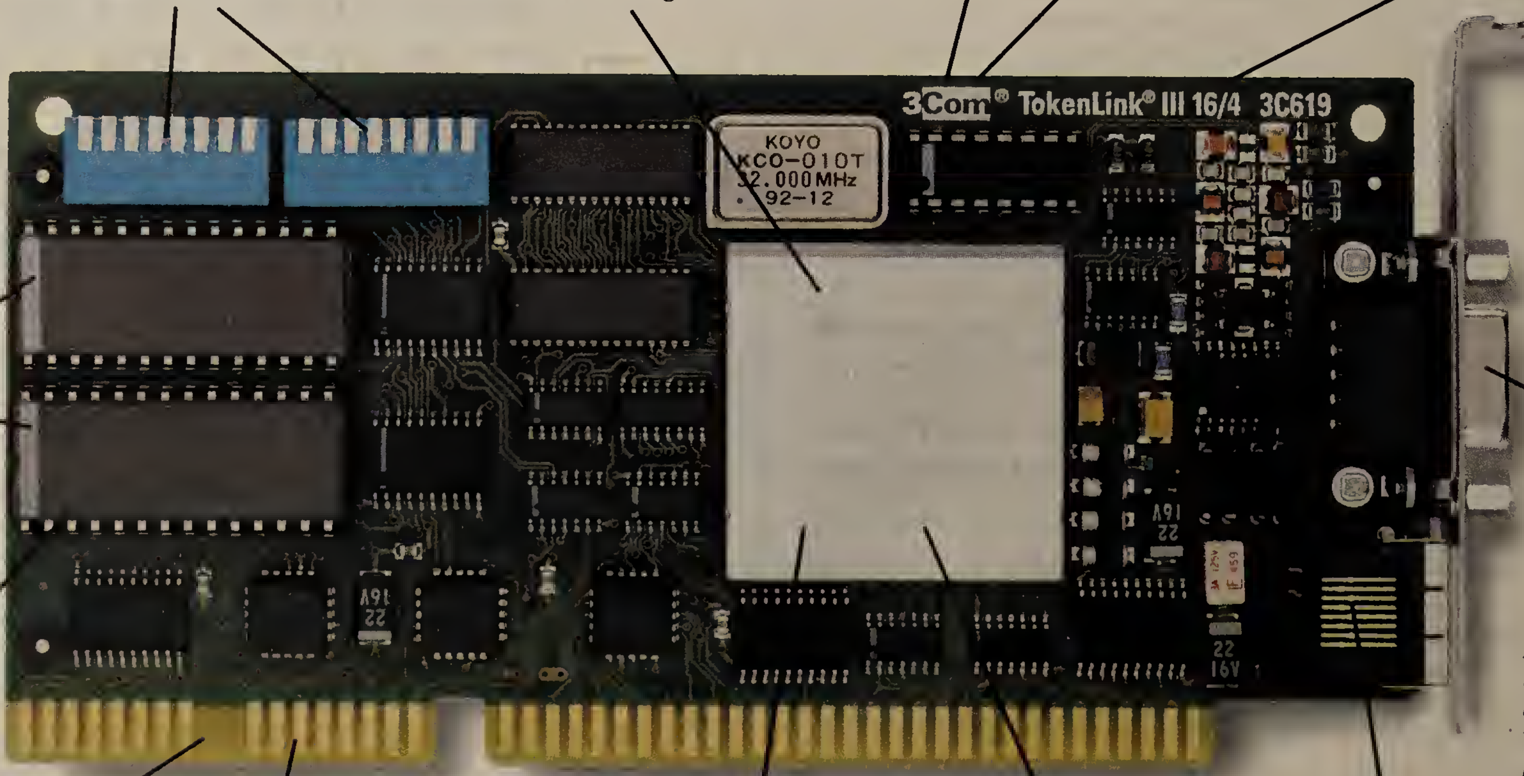
Company	Product	Type	Max. number and type of trunk- and user-side interfaces								Max. number and type of user-side interfaces							Max. through-put (bit/sec) (1)	Expansion	I-mux proto-cols	I-mux incre-ments (bit/sec)	Max. no. concur-rent I-mux calls	Inte-gral:	Net mon-itor-ing	Mgt.	Vid-eo MCU sup-port	Price range/ Warranty period (months)
		B = Shared bus S = Dynamic switching	T = Trunk-side U = User-side	T-1	T-1 ISDN PRI	E-1	E-1 ISDN PRI	ISDN BRI	DDS	Switched 56K bit/sec	V.35	V.25bis	RS-449	RS-366	RS-232	X.21	Nx56/64K bit/sec I-mux		Number of interface card slots (2)	B = BONDING H = H.221 P = Proprietary	A = 56/64K B = 384K D = Base plus varied channels		B = Bit error rate tester C = Channel service unit P = Protocol analyzer	C = Carrier U = User	C = Control panel P = PC or terminal needed S = SNMP		
Teleos Communications, Inc. (908) 389-5700	VideoHub Model 200	S	T	18	18			72			34		34	34	2	34	34	18M	18	B, H, P	A, B	34	P	C, U	P	✔	$18,000-$65,000/3
			U	18	18			72																			
	NetworkHub Model 40	S	T	4	4			8			2		2	2	2	2	2	8.192M	2	B, H, P	A, B	2	P	C, U	P	✔	$7,500-$12,000/3
			U	4	4			8																			
	NetworkHub Model 60	S	T	16	16			16			4		4	4	2	4	4	16M	4	B, H, P	A, B	4	P	C, U	P	✔	$9,000-$25,000/3
			U	16	16			16																			
	NetworkHub Model 200	S	T	18	18			72			34		34	34	2	34	34	18M	18	B, H, P	A, B	34	B, C	C, U	P	✔	$18,000-$65,000/3
			U	18	18			72																			
Tylink Corp. (800) 828-2785	SNS 4000	B	T	1	1						4	4	4	2	4		4	1.544M	2	B	A, B, D	4		C, U	C, P, S	✔	$6,995-$8,995/12
			U	1	1																						

Products highlighted by color were selected for The Short List.

FOOTNOTES:
(1) Throughput figures are for fully loaded configurations.
(2) The number of interfaces each card slot supports varies by vendor.

BONDING = Bandwidth on Demand Interoperability Group
BRI = Basic Rate Interface
DDS = Digital data service
MCU = Multipoint conferencing unit
PRI = Primary Rate Interface
SNS = Switched Network Server

SOURCE: TELECHOICE, INC., VERONA, N.J.



A mean time between failure of 20.5 years means you will never have to worry about 3Com's TokenLink III adapters.

3Com TokenLink III adapters fit seamlessly with 3Com Token Ring hubs, bridge/routers, and network management software. They're part of a total Token Ring solution from 3Com.

Available off the shelf from thousands of authorized 3Com resellers worldwide.

Five million computers have been hooked up to networks using 3Com adapters. No other company has more experience in adapter technology.

Supports 16 Mbps and 4 Mbps over shielded and unshielded twisted-pair.

Install TokenLink III exactly as you would any IBM 16/4 Network Adapter or Adapter/A. It's that easy and familiar.

Works with your existing IBM drivers so compatibly, we don't ship TokenLink III with any drivers at all. Just plug in TokenLink III and start networking.

Lifetime warranty. If a 3Com TokenLink III adapter fails during the life of your machine, we will repair or replace it free of charge.

The confidence of your peers: 3Com is an award-winning supplier in the networking industry.

Better reliability costs nothing extra. 3Com TokenLink III adapters are surprisingly affordable.

A universal boot PROM lets you download existing IBM drivers from popular operating systems, such as NetWare, LAN Server, LAN Manager, and Banyan Vines.

A unique 3Com TokenLink III feature: an RPL utility to facilitate easy remote downloading of network drivers.

First to be SNMP manageable. 3Com's LinkWatch™ Token Ring software provides feature-rich, driver-integrated SNMP agents. Also manageable under IBM LAN Network Manager and NETView.

No jumpers or switches to set for unshielded twisted-pair or shielded twisted-pair connections.

Local service and support is easily available through 3Com's worldwide network of partners and distribution.

Need 32-bit EISA? Rest assured, 3Com TokenLink III 32-bit EISA adapters are available for this machine.

16-bit performance. Not just 8-bit.

Money-back guarantee if TokenLink III is not 100% compatible with any application or driver that runs on either an IBM 16/4 Network Adapter or Adapter/A.

IBM-designed TROPIC chip guarantees full IBM compatibility.

On-board, unshielded twisted-pair connector comes standard with 3Com TokenLink III adapters. No need to pay extra for external media filter.

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Oracle, IBM foray into new markets

continued from page 6

agers should be thinking about how these emerging services will allow their companies to reach customers in new ways.

"The distinction between consumer and business services won't be as great in the future," said Don Ryan, vice president of telecommunications at BIS Strategic Decisions, a Norwell, Mass., consulting firm.

> "The distinction between consumer and business services won't be as great in the future," Ryan said.
>
> ▲▲▲

Dixon Doll, a partner at Accel Partners, a venture capital firm in San Francisco, said, "Multimedia presents a challenge to corporate net managers as the planning considerations are different from planning to support other applications."

Bud Huber, chairman of the User Alliance for Open Systems, said new consumer-oriented services could prove useful for business users, too. For example, video-on-demand services could be used by firms to give employees access to instructional videos by dialing up a service provider.

Oracle and US West said they will develop a media server that leverages object-oriented enhancements to Oracle's database. Running on massively parallel computers, the server will anchor multimedia services, such as movies on demand and electronic libraries. The firms said they hope to provide services that will be accessible via a variety of devices, including cellular telephones, personal computers and television sets.

The first service, which was not identified, is targeted for delivery late this year or early next year, Oracle executives said.

US West will work with several information content providers to develop services. The planned services will go hand in hand with US West's strategy to build a broadband net, starting in Omaha, Neb.

IBM and Blockbuster have allied via IBM's Fireworks Partners business unit and Blockbuster's NewLeaf Entertainment Corp. subsidiary to provide "digital entertainment products and services."

Translated, they are looking at developing kiosks for retail sites that would enable shoppers to order videos' and music stored on regional databases linked via a high-speed net. Shoppers could choose the music they want, for example, and have it downloaded onto a blank compact disc.

That would eliminate the need for retail inventory, among other things. Such kiosks could be in place in some locations as soon as next year. ◘

IBM thunders into remote LAN access

continued from page 4

Thunderbird is network operating system-independent and can work with any software supporting the Network Basic I/O System, NETBIOS Extended User Interface, Network Driver Interface Specification, Open Data Link Interface or 802.2 interfaces.

IBM's Person-to-Person multimedia application and Lotus Development Corp.'s Lotus Notes are two of the many applications that work with Thunderbird.

The server can support 32 users coming in at line speeds up to 56K bit/sec. IBM recommends a dedicated 80486 PC, equipped with four eight-port Real-Time Interface Coprocessor cards, for supporting the full contingent of users.

In order to reduce network traffic, the server filters all but the appropriate LAN traffic to the remote workstation.

Personal computers linked to the server can dial out to remote resources. In addition, the server can set up a "casual bridge" between two remote LANs. This solution lets LAN users employ less expensive dial-up links rather than expensive leased lines to communicate.

At-home access

"Companies that have a lot of users dialing in from the road will be best served by this product," said Bob Spickelmier, brand manager for IBM work group solutions. "Users at home can dial up and have access to the same corporate data as if they were on the LAN at the office."

No pricing is available for the Thunderbird product yet because it is still in beta form, Spickelmier said. Users wishing to beta-test the Thunderbird software can receive it for free.

IBM: (800) 426-3040. ◘

Letters

continued from page 37

my company. I believe it would be professionally irresponsible for me to recommend using the Clipper Chip. A criminal is far more likely to bribe or steal keys away from federal law enforcement than to get those keys from the hardware I recommend — hardware not using key registration.

It is my responsibility to recommend the best security I know how to achieve to anyone asking my opinion. That recommendation does not mean that I am a crook or that our customers are crooks.

I assume that you know the difference in both of these cases, but I am concerned about the public impression we might give in the heat of debate.

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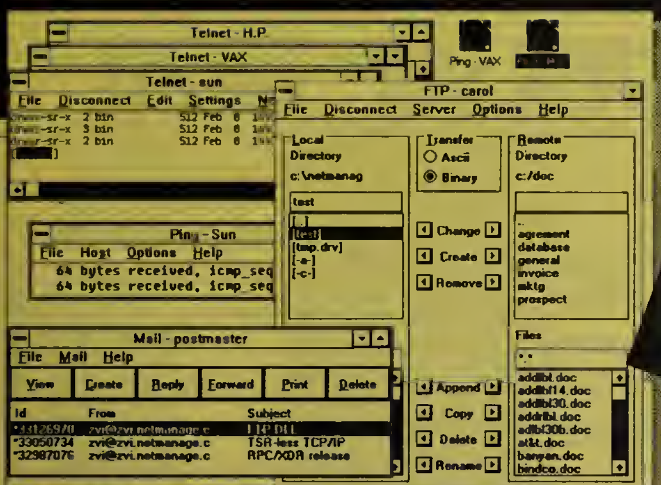
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Change Create Remove Append Copy Delete Rename
Ping - VAX
Ping - Sun
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Mail - postmaster
File Mail Help
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64 bytes received, icmp_seq
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*33050734	zvi@zvi.netmanage.c	TSR-less TCP/IP
*32987076	zvi@zvi.netmanage.c	RPC/XDR release

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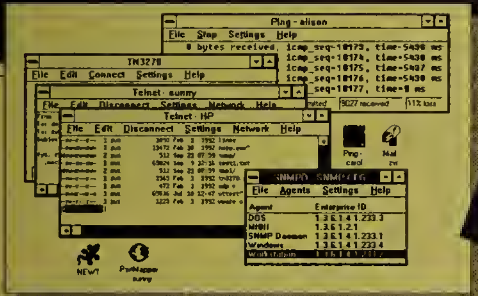

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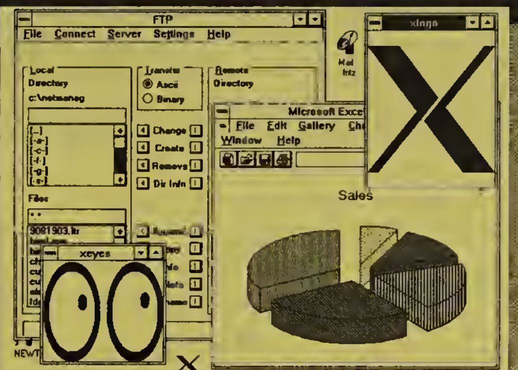

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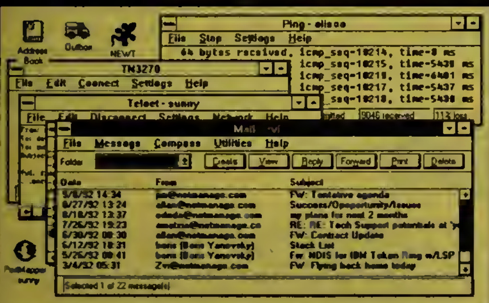

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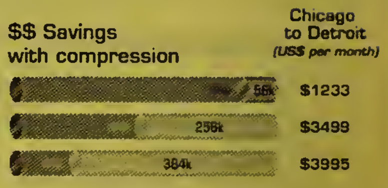

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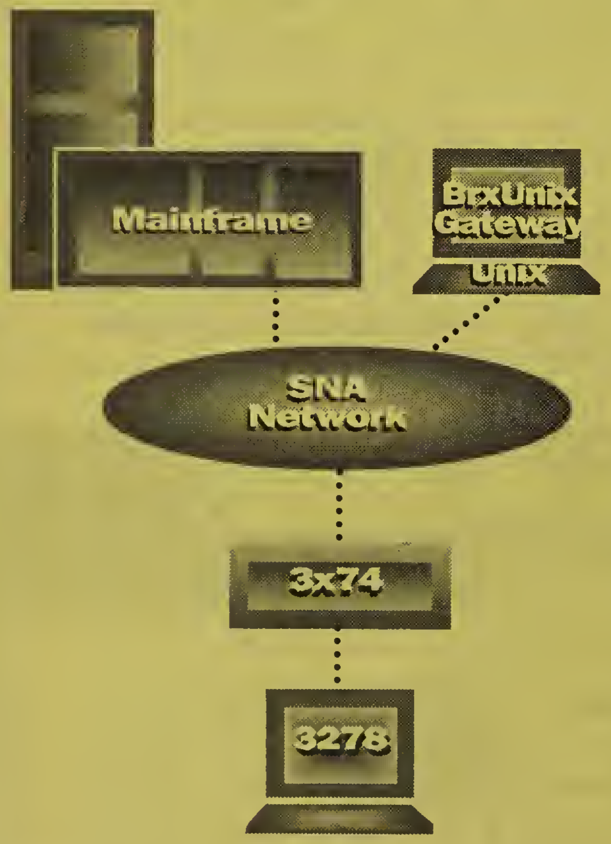

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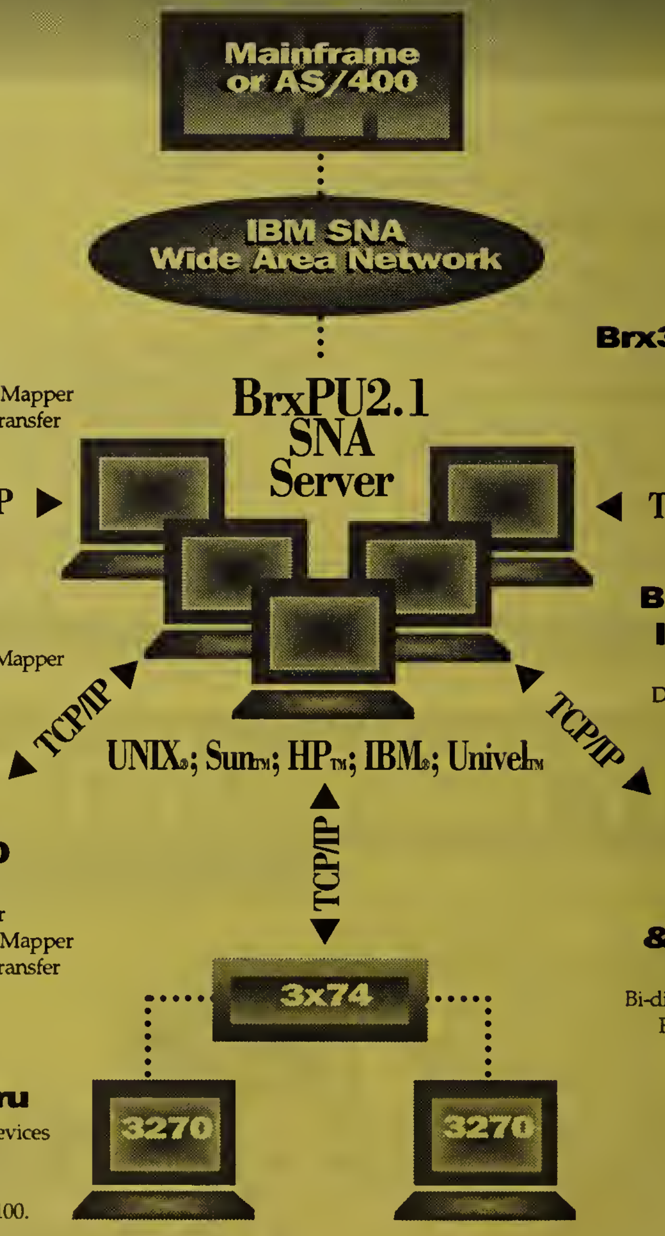

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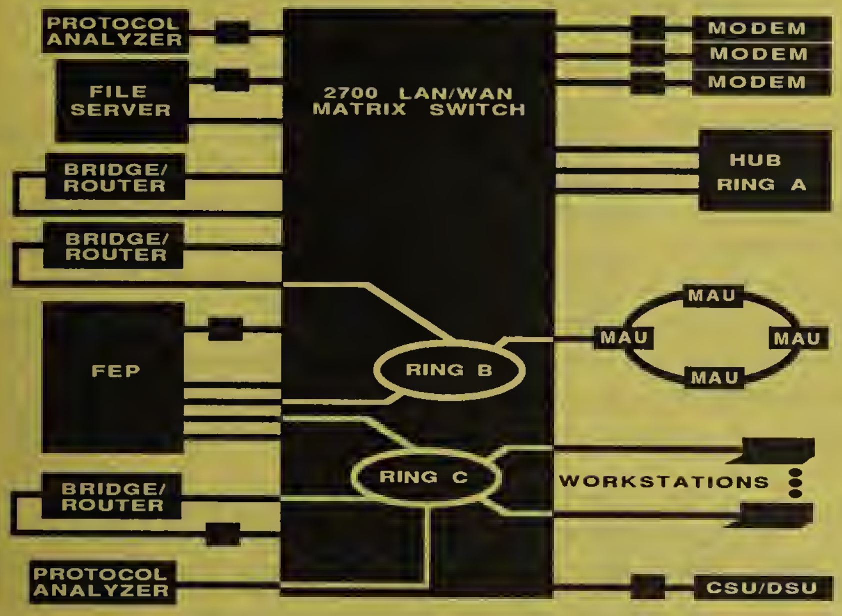

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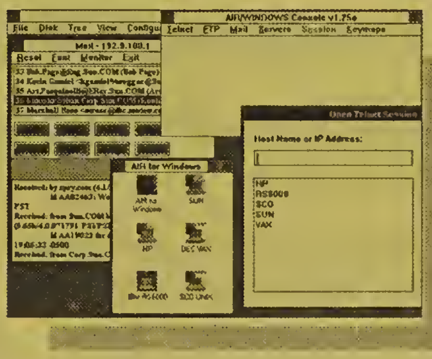

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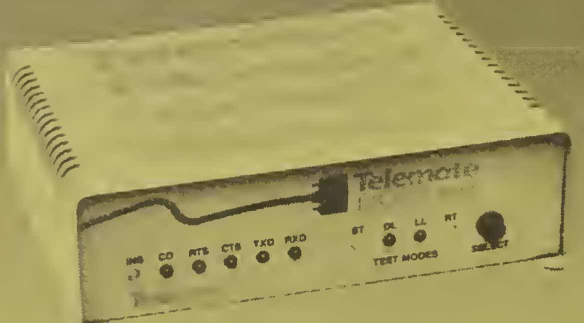

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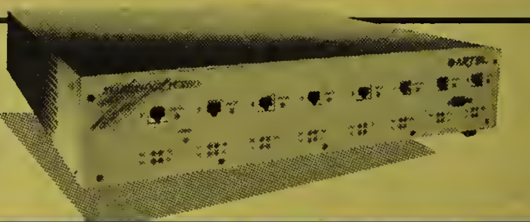

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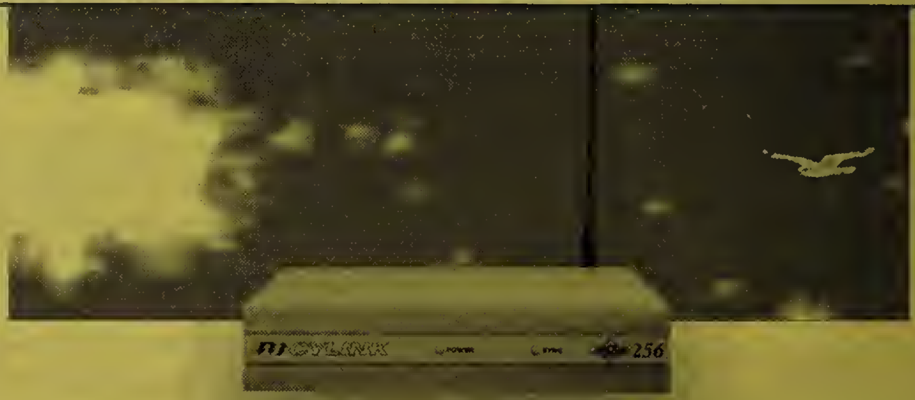

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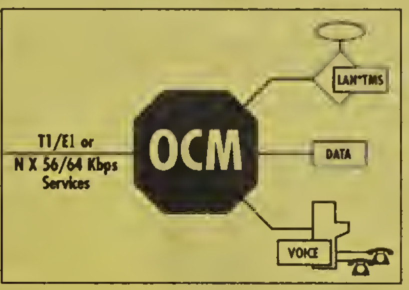

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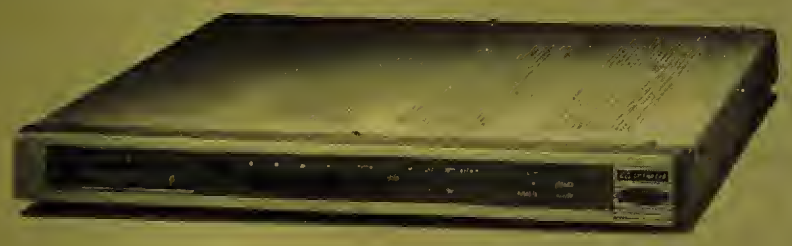

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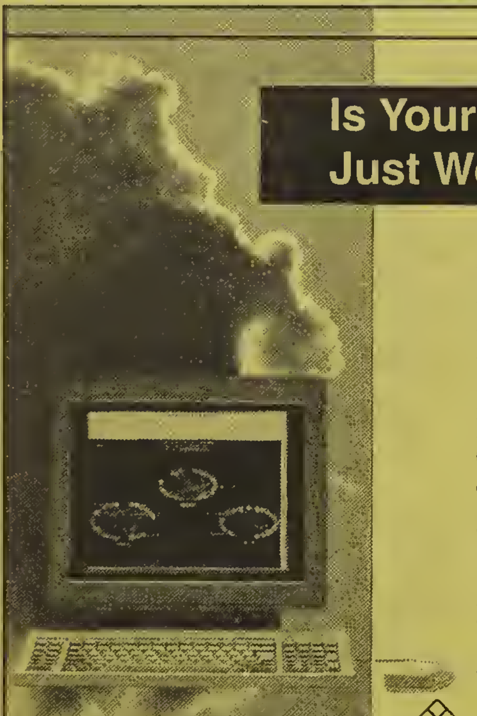

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1. Action requested
1 ☐ Request for sales call
2 ☐ Request for proposal
3 ☐ Request for information

2. Purchase timeframe
4 ☐ Within 60 days
5 ☐ Within six months
6 ☐ Within one year

3. Scope of purchase responsibility
7 ☐ Enterprise wide
8 ☐ Departmental

4. Purchase influence/number of sites
9 ☐ one site
10 ☐ 2-9 sites
11 ☐ 10-20 sites
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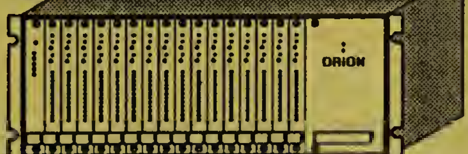

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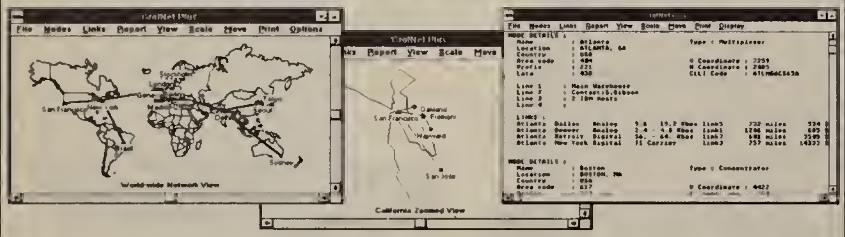

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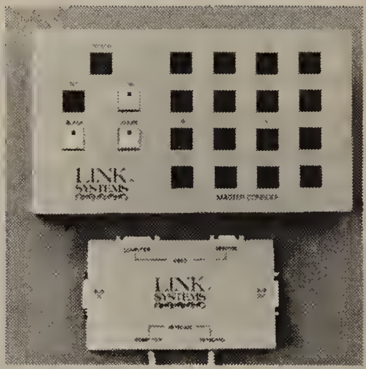

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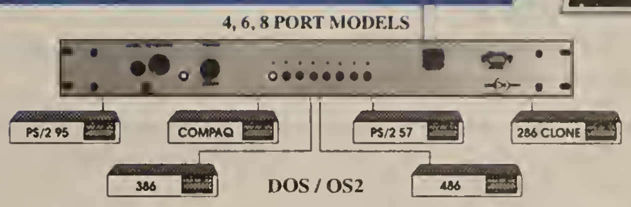

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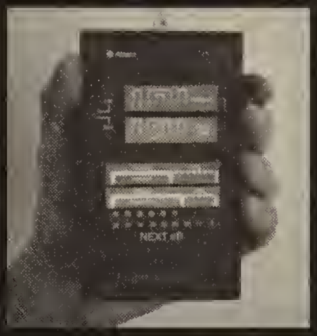

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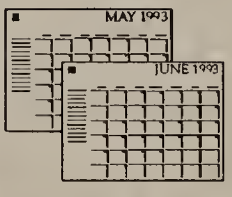

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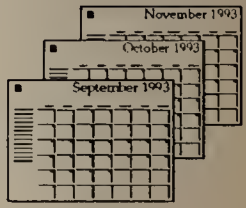

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NT set to make LAN mark

continued from page 1

Windows NT will have a much tougher time displacing NetWare as a file-and-print server and will face stiff competition from a gaggle of Unix vendors hoping to cash in on users attempting to downsize legacy mainframe and minicomputer systems to client/server solutions.

A tough sell

Persuading users to migrate to NT outright, as Microsoft would like to see happen, will be a tough sell, according to Stan Schatt, InfoCorp's director of LAN services. "From a network manager's point of view, the worst thing you can do is ask them to change the NOS," Schatt said. "Microsoft is going to run into more opposition than they think."

Most of the Fortune 500 companies are already running NetWare and Unix, and they will not be eager to add a third NOS. "I still don't think Microsoft understands the needs — and the inertia — of network managers," Schatt said.

NT will come in two flavors. The basic version is intended for high-end users and for servers in small offices and work groups. Windows NT Advanced Server, which adds central management, security features, remote access, advanced multiprocessing support, disk mirroring and duplexing, Redundant Array of Inexpensive Disks (RAID) 5 fault tolerance and support for Macintosh clients, is targeted at larger corporate departments and enterprise applications.

Microsoft will attempt to use price to open doors, as it has in the desktop arena. NT will cost less than $500, while the Advanced Server will cost from $3,000 to $5,000, which is relatively inexpensive compared to Novell and Unix net systems.

"With the networking built into the NT operating system, you don't have to pay big bucks to Novell," said beta-tester Mohsen Moazami, president of Stanford Business Systems, Inc., a systems integrator in Culver City, Calif.

Although NT is not scheduled to ship until the end of June, at the earliest, with the Advanced Server to follow, its effect on network competitors is already being felt.

Profile of Windows NT

Client/server APIs	Protocols supported	Interoperability
DCE-compatible remote procedure call	TCP/IP	NetWare
Windows Sockets	NETBEUI	LAN Manager/LAN Server
Named Pipes	DLC	IBM hosts
NETBIOS	IPX/SPX	VINES
SNA	AppleTalk	Macintosh clients
SNMP/NetView	OSI	Unix variants
	3rd-party protocols	3rd-party gateways

GRAPHIC BY SUSAN J. CHAMPENEY

SOURCE: MICROSOFT CORP.

OS/2 killer

"OS/2 is in Microsoft's gun sights," said Paul Gifford, director and general manager of the Windows NT business operation at Beaverton, Ore.-based Sequent Computer Systems, Inc., which builds servers for Unix and NT.

Sites now running Microsoft's LAN Manager on OS/2 are the most likely candidates to migrate to NT, and Microsoft will offer to help them along with "very aggressive upgrades," said Mike Nash, product manager for NT.

Mark Snuffin, a senior consultant for the systems resource center at an international management consulting company, plans to take advantage of that migration path. The firm's resource center runs Microsoft's LAN Manager on OS/2 Version 1.3 for about 70 servers, he said, and will move to Windows NT as soon as it is stable. Snuffin said the firm likes LAN Manager, and Windows NT is the logical platform on which to run it.

The threat to NetWare, however, is longer term.

Novell built a huge business supplying NOSes to a vast installed base of DOS personal computers that lack inherent networking capabilities. Windows NT challenges that franchise by promising to reunite the desktop operating system and the NOS. "The simplest way to do networking is to put the same operating system on everything," said Paul Cubbage, a principal analyst at Dataquest, Inc. in San Jose, Calif.

Novell's networking expertise and legion of fiercely loyal users will create a strong bulwark against change, however. "There's no way we could ever convince a Novell customer to rip out NetWare and put in NT," conceded Microsoft's Nash. "The strategy there is to slip Windows NT Advanced Servers into existing NetWare environments."

Toe-to-toe with Unix

Windows NT will compete immediately with Unix on the low end, especially on the Intel Corp. platform. It offers an immediate alternative to such products as Univel's UnixWare and The Santa Cruz Operation, Inc.'s SCO Open Server. But the big prize is the emerging market of downsized mission-critical applications. NT and Unix attack this market from opposite directions.

Windows NT was designed to leverage the easy-to-use interface that made Windows a success on the desktop. But the tight integration of the desktop and server can also hinder efforts to work with the multitude of vendors, standards and interfaces that characterize the enterprise computing environment.

The profusion of competing Unix products, on the other hand, offers a way to connect to almost anything. But all the choices can bewilder users. "I think Unix is a hell of an operating system," said NT beta-tester Oliver Bailey, owner of OHB Software, Inc. in Rolling Meadows, Ill. "But Unix has never been easy to navigate."

Paradoxically, Unix may subtly benefit at the high end of the market from the arrival of Windows NT, at least at first. Microsoft's endorsement of client/server architectures could lend the concept validity.

"NT was designed as a platform for client/server computing from the beginning," said Gary Voth, Microsoft's senior product manager for corporate and network systems. That does not mean that it will not make inroads as a complete NOS, but it is unlikely to duplicate Windows' dominance on the desktop.

Although NT is powerful and scalable, observers are not convinced that even groups of NT servers will be able to efficiently handle the largest and most strategic net tasks. "You can pull a semitrailer with eight Honda Civics," said Dataquest's Cubbage, "but it's hard to manage."

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Firms whack WAN costs

continued from page 4

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NCR releases new mgmt. app

continued from page 6

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IBM official details net mgmt. plans

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"We are in the process of building an enterprise management system based on NetView/6000 that can manage large, multivendor or SNA environments," said Sanjiv Ahuja, manager of IBM's AIX network management services. "We have some work to do to get to that point, but we are moving in that direction."

Sanjiv Ahuja

Ahuja said one of IBM's prime objectives is to ramp up NetView/6000's support for larger networks.

"NetView/6000 can monitor upwards of 30,000 objects, which is the most in the industry for this type of platform, but it's nothing compared to the two or three million objects NetView can handle," Ahuja said. "The challenge to get close to NetView's level is one we've accepted."

IBM will scale up NetView/6000 by using faster RISC System/6000 boxes, continuing to improve the platform's basic operating system and by enhancing its Systems Monitor/6000 component, Ahuja said.

Systems Monitor/6000 brings distributed management capabilities to NetView/6000. It runs on AIX platforms distributed throughout a network, polls devices local to it and reports management data back to a central NetView/6000.

"SNMP consumes large amounts of bandwidth, which makes managing larger networks very hard," Ahuja said. "We will be setting up a hierarchy of management with the Systems Monitor handling larger segments of the larger networks."

IBM will look to distribute other management functions so the onus of managing larger networks will not fall on a single NetView/6000 platform, Ahuja said. For example, multiple distributed NetView/6000 managers could each handle problem and physical management chores for devices attached to them while passing only the most crucial data to a central NetView/6000 that controls the entire operation.

IBM is also at work on an application that will let NetView/6000 monitor SNA nets. Known as SNA/6000, it will pull user-defined data from an SNA mainframe running NetView and pass it over an LU 6.2 session back to NetView/6000.

"Many users want to manage their SNA and SNMP devices from one platform, and this is how we'll let them do that," said Bruce Hillsberg, manager of NetView design and planning.

Sources indicate that the SNA/6000 application is only the tip of the iceberg in terms of new applications for NetView/6000. Other applications in the works include automation facilities similar to those found on mainframe NetView, such as the ability to automatically restart failed LAN or SNA devices without user intervention.

Another application would let NetView/6000 users pull database information from NetView's Resource Object Data Manager, which is NetView's object-oriented database for storing NetView management data.

IBM will also be adding support for databases from vendors including Sybase, Inc., Informix Software, Inc. and Oracle Corp., Ahuja said. NetView/6000 supports only Ingres databases today.

"This will give customers a choice of databases to store their network management information," Ahuja said.

Sources indicate that IBM may also be working to bring its own object-oriented database to the platform. IBM recently purchased a stake in Object Design, Inc., a Burlington, Mass., object-oriented database provider, and there is speculation that Object Design's technology will find its way to the NetView/6000 platform.

"We can't say what we're going to do with that, but watch this space," Ahuja said.

Industry observers said IBM's moves reflect the trend toward downsized, distributed networks.

"My crystal ball says that ultimately NetView will become an element manager for NetView/6000," said Ellis Gregory, president of NetTech, an independent NetView software development firm in Raleigh, N.C. Gregory worked on NetView development at IBM until a few years ago. "We are seeing a lot more SNA users willing to go to the downsized managers such as NetView/6000."

The NetView/6000 platform can manage more environments more effectively than NetView, said Anura Guruge, an independent strategic consultant, based in New Ipswich, N.H. "Strategically, it is the right way to go for IBM," he said.

Vendors inch their way to collaboration

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cate the market about the value of message-oriented middleware and the role it can play in building flexible and scalable distributed applications," said Jeff Arnold, president of Momentum Software in Englewood, N.J.

To facilitate the education process, the vendors said they first need to agree on the terms used to describe middleware functions or features, such as asynchronous or context bridging. These terms are often used differently by vendors.

The group also plans to publish case histories about users that have implemented MOM and publish a series of white papers on MOM technology. The vendors also plan to discuss at their next meeting in June whether they should establish the group as a legal entity that would be open to all vendors selling MOM products, as well as interested users.

Users want standards

Users reacted positively to news of the vendor gathering but said the group should extend its mission to establish interoperability and portability standards. Beyond that, they said the group should work with consortia such as the Object Management Group (OMG) and the Open Software Foundation, Inc. (OSF) to have middleware standards incorporated into open distributed computing models.

"They've taken a positive first step, but we need to see some deliverables," said Keith Soldner, director of networking at Motorola Land Mobile Products Sector in Schaumburg, Ill. "Users would benefit a great deal if they got together and established standards for interoperability."

Several users said the MOM group should commit to establishing a common application program interface (API). "If vendors established a common API for interprogram messaging, it would make our life a lot easier," said Mike Purcell, staff software engineer at Baxter Healthcare Corp. in McGaw Park, Ill.

According to Purcell, Baxter plans to place a layer of software between applications and middleware to minimize the risk of purchasing a product from a vendor that may go out of business in the next few years.

"Interprogram messaging, while valuable, is extremely new, and it's not clear how the products will shake out in the market since most of the vendors in the field are small start-up companies," he said. "A common API, especially if it is part of OSF's [Distributed Computing Environment] would minimize the risk of deploying these products."

Users also said the formation of a vendor/user association devoted to interprogram messaging might help spur the OMG and OSF to incorporate MOM technology into their respective distributed computing standards.

"We would like to see this group propose to the OMG an asynchronous messaging service that would be enabled on top of [Common Object Request Broker Architecture]," said Paul Engelberth, senior systems analyst for Deere & Co. in Moline, Ill., and a member of OMG's Object Services Task Force and End-User Special Interest Group.

Currently, OMG's CORBA, an API for accessing object request services, does not support queued asynchronous messaging, which users said is not high on the list of services that OMG plans to specify in the near future.

"You can reassure the [MOM vendors] that they would get solid and firm support from OMG's end-user members if they presented an asynchronous messaging option for incorporation within CORBA," Engelberth said.

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Circle Reader Service #16

State forges ahead with ATM network

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of users building ATM networks.

The North Carolina project required an unusually high degree of coordination between multiple carriers — Southern Bell, GTE Telephone Operations and Carolina Telephone — and could serve as a model for other users.

Religious experience

"Right now, ATM is like a religion that people believe in but can't say why," said Tom Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy. "All segments of the industry will be looking to the state of North Carolina to talk about the capabilities, costs and benefits of ATM."

The state's ATM network will carry traffic from three predecessors, an expansive digital microwave network that serves 50 sites, the State Information Processing Services network — an IBM Systems Network Architecture net — and a high-speed LAN internetwork.

"We looked at our options, which came down to one choice — expanding our microwave network," Blatecky recalled. "Running a 50-site T-3 microwave network is one thing, but extending it to 300 or even 3,000 sites was not justifiable. And we needed more than T-3 bandwidth."

Jane Patterson, an advisor to North Carolina Governor James Hunt, said the state's ATM network will support applications including video-based criminal arraignment and parole hearings and remote medical imaging, all of which will drastically cut travel expenses and paperwork.

Less cutting-edge applications, such as local-area network interconnection, will be among the first supported over the statewide ATM network, said Blatecky. "We've got end users saying they need to link Ethernets, while others are pushing for native [Fiber Distributed Data Interface] connections."

The state has aggressive rollout plans, he said, promising to tie about 100 large sites to the ATM backbone in a control phase that runs for roughly a year, then add sites at a clip of 500 to 600 a year for several years.

Building the backbone

The backbone comprises Fujitsu Network Switching of America, Inc.'s FETEX-150 All Bandwidth Switches in nine cities, which are linked using Synchronous Optical Network fiber transmission systems running at speeds ranging from 155M (Optical Carrier-3) to 2.4G bit/sec (OC-48).

> "Right now, ATM is like a religion that people believe in but can't say why," CIMI Corp.'s Nolle said.
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Southern Bell will install FETEX-150 ATM switches here and in Asheville, Charlotte, Greensboro and Wilmington.

GTE will install Fujitsu switches in Durham and Research Triangle Park, while Carolina Telephone will place one switch each in Greenville and Fayetteville.

Each carrier will install switches in its territory.

The ATM backbone will support several types of high-speed access, ranging from T-1 Switched Multimegabit Data Services links to OC-48 connections.

Organizations wishing to access the network in the first year or two will have to install Fujitsu-provided on-site multiplexers with a proprietary ATM interface that allows the devices to pass traffic to the FETEX-150 switch.

Initially, sites that want native ATM access to the backbone will have to install Fujitsu-provided multiplexers with a proprietary ATM interface that works with the FETEX-150 switch. When router and other equipment vendors deliver standard ATM interfaces, those, too, will be supported, Blatecky said.

"Although people will ask how small sites like grade schools will justify a T-1 [access link], they have to remember that the sites will have access to numerous applications," Blatecky said "We've already got 110 hours of interactive video programming a week [for schools]."

The state expects the net will save what it called a large amount of money but could not say how much. Analysts said users will be looking to the state for just such information.

"The industry needs users to be able to put ATM in business perspective as soon as possible," Nolle said. "Carriers can't simply throw in a bunch of ATM switches and expect users to beat a path to their doors." ◘

AT&T to announce new billing package

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and the huge paper bills that Software-Defined Network and Tariff 12 customers sometimes face.

An AT&T spokesman confirmed that the company will introduce AT&T Billing Edge at the International Communications Association ComNet Conference here and said it will initially be offered to users of SDN and the UniPlan calling plan for mid-size businesses.

Announced in January, UniPlan is a calling plan designed for firms that spend $24,000 to $1 million a year on long distance. They can combine use of 800 and outbound services for discounts of up to 32%. The carrier will begin offering the package for custom network users and users of 800 and Megacom outbound services in the next year.

Not all AT&T customers will be charged for AT&T Billing Edge. When asked if users will pay for the package, the AT&T spokesman replied that it would depend on which service the customer uses.

Companies can save memory on their PCs by using a CD reader the size of a box of envelopes that is provided by AT&T to access call detail information, the spokesman said.

"With AT&T Billing Edge, I don't have to download all my billing information onto a hard disk," Greiner said. "That represents [500M bytes] to 1G byte of memory that I can use for other purposes."

Greiner said the new software program can generate roughly 60 to 70 different reports, including executive reports that give a big-picture look at firms' SDN and UniPlan usage.

"We have reports that track international calling to help us guard against toll fraud, [local access and transport area-pair] pricing reports, others that show calling by authorization codes and reports that show calling card usage," Greiner said. "All of them provide a wealth of useful information."

AT&T Billing Edge also enables network managers to quickly and easily create a wide variety of custom reports.

AT&T: (908) 221-2000. ◘

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